

PREGNANCY OUTCOME IN TAMILNADU

A SURVEY WITH SPECIAL REFERENCE TO ABORTION
COMPLICATIONS, COST AND CARE

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2004

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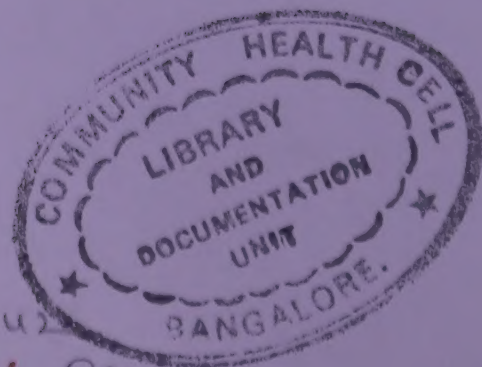
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PREFACE

Center for Enquiry into Health and Allied Themes (CEHAT) of Anusandhan Trust, Mumbai and Health Watch Trust (Jaipur) initiated the Abortion Assessment Project – India and mobilized economic support from Ford Foundation, Rockefeller Foundation and MacArthur Foundation. They conceived this project as a multi-centric collaborative research with the following objectives.

- “➤ Review Government policy towards abortion care, availability of funds, and its flow and policy/programme environment in the country – including family planning.
- Map, understand and analyse abortion care providers-related issues – organisation, management, facilities, technology, registration, training, certification and utilization in the public and private sector.
- Study, understand and analyse user perspective with special focus on women’s perceptions of quality, availability, accessibility (including barriers to utilization of safe abortion facilities), confidentiality, consent, post-abortion contraception and attitude of service providers.
- Study social, economic and cultural factors that influence decision-making: impact of changing social values, male responsibility, family dynamics and decision-making.
- Costing and finance issues related to the above.”

Towards achieving these objectives a five-pronged approach was designed.

- “ 1. Taking stock of policy instruments/data/research through overview and working papers.
2. Multi-centric facility survey in six states.
3. Eight qualitative studies on specific issues: Women's perspectives, provider's perspectives, post abortion care, sex selective abortion and informal providers.
4. Community based studies to get a better understanding of abortion in two states.
5. Dissemination and advocacy. ”

It was also ensured that the research partners agree on a code of ethics involving:

- “ • Informed consent
- Protect identity of respondent
- Wide availability of compiled data
- Constituting ethics committee in institutions.
- Review of research tools/methodology to ensure ethical research. ”

There are many reasons for the lack of reliable estimate of pregnancy wastage in India. One of the major reasons repeatedly upheld for a long time is that induced abortion was illegal and hence women do not easily disclose the incidences. Even after the liberalization of abortion by the Medical Termination of Pregnancy Act in 1971, experts opined that the matter of inducing abortion is too personal an act to be disclosed to a stranger (Investigators of Survey Research), as it is still not considered to be a socially acceptable behavior. Anticipating serious response errors in abortion data, no one dared to estimate the incidence through survey technique until the National Family Health Survey during 1992-93. Even in this

survey the main focus is on the estimation of demographic parameters and certain health indicators; abortion is one such. Practically no large-scale survey until the present one had the main objective of estimating the incidence of abortion and related social and economic factors.

The incidence rates arrived at from the earlier surveys was considered to be gross under estimates because it was felt that the incidence should be much higher than the estimates. Of course there was no other empirical support for holding such views but such a view was widely prevalent. There were also attempts to estimate the incidence rate of induced abortion by using certain indirect methods. Some are unbelievably too low and some are too high. Further there is a tendency among researchers to accept higher estimates and dump the lower estimates by blaming the methodology for its assumptions and lack of robustness.

Under these circumstances, it was felt worthwhile to undertake a community based survey with the aim of estimating the incidence of abortion, abortion related maternal morbidity and cost and care associated with abortions. This is not to say that such a survey would provide totally reliable estimate of the level of incidence. With the introduction of family planning mass education programmes and awareness programmes on HIV/AIDS over the past few decades, there has been a significant change in the social milieu relating to exchange of views on sex and motherhood related matters. Reproductive health matters are telecasted and broadcasted. This stimulates discussions in the public. Recent small-scale studies reported that their experience in data collection even on matters such as coitus frequencies is not bad. This changed social environment made us to rethink and venture a survey research on the issue of induced abortion and expect results of acceptable quality when probing and cross-checking, of course not to the extent of annoying the respondents, are built into the process of eliciting information from women. Indeed, as we could see in the body of this volume, the results are encouraging. This study also attempts to provide pregnancy wastage related health consequences to women, cost, care and other details, which on their own right are useful for policy advocacy and in programme execution.

This volume is based on community survey of representative sample of ever-married women from Tamil Nadu. A similar survey is also carried out by another team in Maharashtra. Both utilized the same set of survey protocols to have comparable data. It is our humble view

that this volume, wherein results of Tamil Nadu survey are presented, provides facts on pregnancy outcome and related maternal morbidity, cost, care, utilization of services, etc with greater accuracy. We believe that by contributing to the knowledge this report would attract the interest of researchers and analysts in this field of immense utility. We hope that the report provides useful information to policy makers and programme managers in the field of population and reproductive health.

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ACKNOWLEDGEMENTS

Successful completion of this survey was possible due to the effort and commitments of numerous agencies and individuals at various stages of it. We are thankful to everyone who contributed to the survey and made it a success.

First of all we are grateful to Dr. Ravi Duggal, Chief Functionary, Centre for Enquiry into Health and Allied Themes (CEHAT) of Anusandhan Trust, Mumbai for his overall support and encouragement during the entire period of the survey. Also the support and encouragement from Dr. Vimala Ramachandran of Health Watch, Jaipur are acknowledged gratefully.

We like to record our appreciation to Dr. P.M. Kulkarni, who at the time of proposing the survey was with us as co-investigator and contributed a lot in developing the proposal. By the time the survey was funded, he was with the Jawaharlal Nehru University and hence could continue to help us only as a technical consultant to the project. Consultations we had with him time-to-time were of immense use in the proper conduct of the survey. We thank Dr. Mohana Vi. Ramesh, who served as medical consultant to the project and gave constructive suggestions and comments.

One of the unique features of this survey is the constitution of an institutional ethics committee. We thank all members of the institutional ethics committee, Dr. G. Vanithakumari, Dr. Mohana Vi. Ramesh, Ms. Shelley Saha, and Ms. S. Manonmani for their support and constructive suggestions.

A survey of this magnitude is not possible without the support of various agencies. Dr. P. Krishnamoorthi, then Director of Health and Family Welfare readily extended support when we approached. His support and the support from the Joint Directors of Health and Family Welfare Department at the district level are gratefully acknowledged. Personnel at the Primary Health Centers, Sub-Centres and Panchayat Offices in the sample areas were very helpful in providing accommodations to the field staff and facilitating the data collection. They all deserve special thanks.

All those involved directly in the survey are listed in Appendix H. Our Supervisors and Field Investigators were not hesitant to stay at places with least facilities, but still did an excellent job of interviewing sample respondents with all sincerity and patience. The monotonous jobs of data entry and verification have also been carried out with devotion. Besides the Principal Investigator, Co-Investigator, Research Associate and Research Assistants, Ms. Shelley Saha, Dr. U.R. Kaliappan and Dr. P. Arumugam trained the Field Supervisors and Field Investigators. We thank them all and the Office Secretary for their help.

A consultative meeting for the project held in Coimbatore on 22nd April 2004 to discuss the findings of the Tamil Nadu survey was attended by Dr. Ravi Duggal, Chief Functionary, CEHAT, Mumbai, Dr. Mohana Vi Ramesh, Gynecologist, ESI Hospital, Coimbatore, Dr. Sundari Pavidran, Achutha Menon Centre for Health Science Studies, Trivandrum, Dr. S. Gunasekaran, Professor and Head, Department of Sociology, Pondicherry University, Dr. B. Antonisamy, Professor and Head, Department of Biostatistics, Christian Medical College, Vellore, Dr. P. Arumugam, Professor of Economics, Bharathiar University, Dr. T. Chandra Mohan Reddy, Professor and Head, Department of Sociology, Bharathiar University and Dr. U. R. Kaliappan, Former Professor of Sociology, Bharathiar University. We gratefully acknowledge their help in extending valuable suggestions for the improvement of this report.

Administrative support provided by the Vice-chancellor, the Registrar and the Head of the Department of Population Studies of Bharathiar University to the project is acknowledged with thanks.

Dr. J. Richard, Dr. P.M. Kulkarni and Dr. U.R. Kaliappan patiently went through the draft and generously commented on the report. Their comments were extremely helpful in improving the report. We record our thanks to them.

Abortion Assessment Project – India of CEHAT and Health Watch, who in turn were supported by the Ford Foundation and the Rockefeller Foundation, approved our proposal and provided generous funding for the project. Our sincere thanks are due to all of them.

This acknowledgement will be incomplete if credit is not given to all those who responded to the household and woman's questionnaires. We thank them all for sparing their time and patiently responding to the questionnaire with trust.

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SUMMARY OF FINDINGS

This survey, conducted in 2002-03, was designed to provide information on incidence of live births, stillbirths, spontaneous abortions and induced abortions in Tamil Nadu. It also aimed at providing information on service provider, post-abortion complications, cost and care associated with spontaneous and induced abortions.

Field staff collected the data from a self-weighting systematic, multi-stage stratified sample of households. They covered 5487 households and interviewed 4814 ever-married women in the age range 15-49 between October 26, 2002 and March 31, 2003.

Background Characteristics of the Sample

About two-thirds (65 percent) of the sample households live in rural areas as per the classification of urban and rural areas existing at the time of 1991 Census. Highest proportion of the population is in the quinquennial age group 15-19. Below this age group the proportion of population declines with age reflecting typical age structure of a population with fast fertility decline in the recent past. The percent of population below 15 years of age is 26.5 and that aged 65 and above is 6.1. There are 1008 males per 1000 females. There seems to have been a substantial improvement in age at marriage in the recent past. The percent of ever-married women in the age group 15-19 is 15.0 and this is 0.4 percent among men. The singulate mean age at marriage is 21.9 for women and 27.4 for men.

In the state 87 percent of households are Hindus, 7 percent Muslims and 6 percent Christians. The concentration of Muslims and Christians is more in urban area. In urban area they constitute 24 percent of households. Twenty-two percent of the households belong to Scheduled castes and one percent of households belong to Scheduled tribes. Seventy-three percent of the families are nuclear and the difference in this percent is marginal between rural and urban areas.

Eighty-seven percent of the households have electricity, 82 percent have piped water supply, and 34 percent have flush toilets. Thirty-nine percent of the households own radio or transistor, 31 percent have black & white TV and 24 percent have colour TV.

Eighty-four percent of males and 69 percent of females age six and above are literates. Both among males and females in the age 10-14 ninety-seven percent are literates. The gender gap in literacy has been bridged in the younger cohorts. In fact in the urban area the literacy rate for the age group 10-14 is 97 for males while it is 99 for females.

Medical Consultation for Illness among Family Members

If someone in the family falls ill about 53 percent of rural families seek government sources whereas 55 percent of urban families seek private service. Among those seeking government sources 59 percent prefer it for their free service. During one month preceding the date of survey around 32 percent of rural as well as urban households reported that some one in the family was sick. Fever, cold, cough and headache are the frequently reported illnesses. Pain in the body or limbs is the next in the order of frequency followed by problems of the digestive system (stomach pain, dysentery and vomiting). Type of medical consultation for these specific illnesses also reveals the pattern reported above.

Fertility and Infant Mortality

The crude birth rate in Tamil Nadu is 18.2 for the period 2000-2002. The total fertility rate is 1.94 and this is below replacement level of about 2.1. Even though the fertility is very low and is below replacement level, the age pattern of fertility shows early peak. In the age group 20-24, where the fertility peaks, 45 percent of the total reproduction takes place.

The infant mortality rate is 39.1 per 1000 live births. The neonatal mortality rate is 26.7 per 1000 live births and the post-neonatal mortality rate is 12.4.

Pregnancy Outcome

Current rates of age-specific birth, stillbirth, spontaneous abortion and induced abortion are computed based on the enumerated pregnancy outcomes. These rates imply that a woman at the end of her reproductive period would have 2.35 pregnancy outcomes, out of which 1.92 are live births, 0.04 are stillbirths, 0.21 are spontaneous abortions and 0.18 are induced abortions. In terms of percentage, the live births are 82.2, stillbirths are 1.7, spontaneous abortions are 8.9 and induced abortions are 7.1.

The percent of induced abortions increases with rising order of outcome. Induced abortion out of all pregnancies reaches the level of about 18 percent among women with fifth pregnancy or above. Urban women start inducing pregnancies at lower order of pregnancies than the rural women. As induced abortion is a competing risk, the proportion of spontaneous abortions moderately declines by order of pregnancy. About eight percent of first order pregnancies end in spontaneous abortions as against about six percent among fifth and higher order pregnancies. This finding once again supports the observation made also by others that induced abortions are being used as a method of contraception or as a back up to temporary methods of contraception.

Underreporting of spontaneous abortions that took place within 12 weeks of gestation is observed. All induced abortions had a gestation period of first or second trimester. Induced abortions during the first trimester constitute about 60 percent. Among rural women 75 percent of induced abortions are of gestation period 8-15 weeks, and this percent is 84 among urban women. If we consider a gestation period of 16 weeks or more is late for inducing, the proportion of late inducing is 12 percent in rural and 6 percent in urban areas.

The percent of induced abortions of all outcomes increases from 3.1 percent among illiterates to 6.7 percent among those completed high school. Percentage of spontaneous abortions declines with increasing asset level while the percentage of induced abortions increase with increasing asset level.

Association between Successive Outcomes

There is association between successive outcomes. If the first pregnancy is a live birth, the chances for the second pregnancy is also a live birth is 89 percent and the chances of ending in a stillbirth or spontaneous abortion is 7.5 percent. About 22 percent of the second pregnancies end in stillbirth or spontaneous abortion if the first outcome is a stillbirth. About 30 percent of the second outcomes are spontaneous abortions if the first outcomes are spontaneous abortions. A similar association is found between second and third pregnancy outcomes, between third and fourth outcomes and so on. These findings suggest that some women are prone to spontaneous abortions and/or stillbirths.

As regards induced abortion, the chance of successive pregnancies ending in induced abortion increases with increasing order of birth. While 11 percent of all fourth pregnancies are aborted, among those who aborted their third pregnancies this percent is 31. This is indicative of women using induced abortion as a terminal method of contraception. This is also supported by the fact that the higher proportion of higher order pregnancies ending in induced abortion if the previous one is a live birth.

It is found that the chances of repeated abortions increase with increasing number of living children. The proportion of women with repeat abortions is higher among better educated than among illiterates.

Estimates of Pregnancy Outcomes Adjusted for Underreporting of Events

Estimates indicate an underreporting of approximately 27 percent in spontaneous abortions among the recognizable pregnancies (pregnancies with at least 8 weeks of gestation). In a few pockets of Tamil Nadu female selective abortions are reported to be prevalent. However, check for underreporting of sex selective abortions indicate that the incidence of sex selective abortion is too less to be ascertained for the whole of Tamil Nadu even by as large a sample as in this survey. Hence it is concluded that the incidence of sex selective abortion is insignificant and hence underreporting of induced abortion due to sex selection is treated to be close to zero.

After adjustment for under-enumeration of spontaneous abortions the percent distribution of outcomes is computed. The adjusted percentages are: 79.4 live births, 1.7 stillbirths, 12.2 spontaneous abortions and 6.7 induced abortions. After adjustment for underreporting of spontaneous abortions the expected number of outcomes per woman at the end of reproduction is 2.54, out of which 1.92 are live births, 0.04 are stillbirths, 0.39 are spontaneous abortions and 0.18 are induced abortions.

For the projected population of 64 millions in the year 2004, assuming the crude birth rate of 18.2 observed in our survey, the estimates of the pregnancy outcomes are 1,170,000 live births, 25,000 stillbirths, 181,000 spontaneous abortions and 99,000 induced abortions per year.

Estimate of Unregistered Induced Abortions

Assuming the average crude birth rate of 19.1 for the years 1997 and 1998 from the Sample Registration System, the estimate of live births during the financial year 1997-98 is 1,144,000. Applying the ratio of 8.487 induced abortions per 100 live births obtained from the survey, we get 97,000 induced abortions during 1997-98. The registered induced abortions are 47,620 (Family Welfare Programme in India Year Book). This suggests that 51 percent of the induced abortions are not registered in the year 1997-98.

Place of Delivery

The percent of home deliveries during 1998-2003 is 15, which varies by residence: 20 percent in rural area and 5 percent in urban area. About 45 percent of deliveries take place in government hospitals both in rural and urban areas. Percent of home deliveries is high for higher order births both in rural and urban areas.

Spontaneous Abortions

Perceived reason

More than two-fifths of women are not able to ascribe any reason for the incident of spontaneous abortion to them. Strain of work is reported as the cause for thirteen percent of spontaneous abortions. Frequent travel and falling down are the causes for another 7 percent of the cases. Nine percent of women report that no reason can be attributed as it occurs frequently. In eight percent of the cases women report that weak uterus as the possible cause for the event and for another six percent the cause is general weakness.

Post-abortion medical care

Twenty four percent of the cases did not take any treatment after spontaneous abortion. More than three-fifths of the women approached private health care providers and 11 percent went to the government health care providers after spontaneous abortions. Only 3 percent of them relied on self. About 47 percent of women underwent Dilatation and Curettage and another 21 percent were given injection and tablets/drips. Private health care providers (68 percent) had done D& C after spontaneous abortion for more cases than the government health care providers (47 percent).

Cost

Twenty seven percent of women either did not seek any treatment or resorted to self-treatment after spontaneous abortion. Majority of women traveled by bus to go to and return from the service provider. Only 14 percent of the cases used auto-rickshaws in both directions. Cross-classification reveals that, by and large, the same mode of transportation is used for onward and return travels. The average distance traveled by those who resorted service is 13 kilometers (Median = 8 km).

The average time taken to reach the service provider for post-abortion treatment by those who sought treatment is 36 minutes (Median = 30 minutes). Short distances are managed by motored two-wheelers, bicycles and walk or by hiring three wheelers. If the distance is long, bus, car or van is used. About five percent of the women had to walk an average distance of 1.3 km.

The average time of stay at service provider's place for post-abortion treatment is 23 hours, nearly a day. The median duration of stay is 12.0 hours. Twenty one percent of the cases stayed less than three hours, 19 percent of the cases stayed 3-5 hours and 16 percent of the cases stayed nearly one day for post abortion-treatment. And 17 percent of the cases stayed between 2 and 9 days.

The average expenditure (including service cost, travel, food outside home, accommodation and medication) was Rs.1134 and the median expenditure was Rs. 600. Thirty-five percent of women managed the expenses from their routine household expenditure. For 13 percent of women the entire expenditure was borne by their parents.

Eleven percent of women borrowed from their parents or other relatives. Over all, 21 percent of women had to borrow. The sources for raising loan are parents, relatives, moneylenders and employers.

The mean family wage loss is Rs. 287. Average cost, both direct and indirect, per spontaneous abortion is Rs. 1421, out of which 80 percent is direct cost. The median cost is Rs. 900.

Family support

Sixty percent of women were completely and 17 percent were partly freed from household chores after spontaneous abortion. One-fourths (24 percent) had no freedom from household chores. Twenty-nine percent of women received help from women from husband's side and another 29 percent from mother's side. Among those who had a child less than 10 years of age at the time of the event, 43 percent did not get help in child care from any one. Women from husband's side extended help in childcare in 25 percent of the cases and women from mother's side in another 26 percent of the cases.

Induced Abortions

Motive

For a substantial proportion of women (42 percent) the reason to go for induced abortion was to stop having more children. Another 42 percent of women resorted to it to space childbirth. Nine percent of abortions were carried on medical advice - 5 percent for reasons of poor development of embryo or possible birth defect and 4 percent for reasons of potential risk to mother's life. Members in the family did not want the baby in 2.5 percent of the cases.

Decision-making

In 95 percent of the situations husband knew about his wife resorting to induced abortion. Only about half of the women take decision either by themselves or along with their husbands. In another half of the cases, husband decides either alone or along with woman's parents or along with his parents.

Service provider

Eighty percent of the women approached private health care providers. Government health care institutions provided the service to 16 percent of induced abortions and 3.5 percent of abortions were carried out by quacks. Both among government and private providers 90 percent use D&C to induce.

Cost

While for onward journey to the provider's place women prefer cheaper mode of travel, they prefer safe mode of travel for returning home. This is because D&C is performed to many women and hence they need to travel by a comfortable mode on their return. On the average a woman has to travel 36 minutes (Median = 30 minutes) to cover an average distance of 12.8 km (Median = 6.0 km) to reach the place of provider. Thirty-seven percent of women stayed at the provider's place for more than a day. The average duration of stay is 26 hours (Median = 12 hours).

Overall the average expenditure for an abortion is Rs.1335 and the median expenditure is Rs. 950. This includes provider's fee, medicine, and travel, food and accommodation outside home for the individual and the accompanying persons. For D&C alone the average cost is Rs.1337 for service in private institutions, which is almost double as that in public institutions (Rs. 759). When D&C is followed by sterilization the cost in private institutions escalates to an average of Rs. 3561.

Fifty-six percent of women managed the expenses on induced abortion out of household routine budget. Thirteen percent of women borrowed from their parents and 9 percent borrowed money from moneylenders.

The average wage loss for the woman undergoing induced abortion and her family members on account of induced abortion was Rs. 287. Average of both direct and indirect costs per abortion add up to Rs. 1622 and the median is Rs. 1000.

Family care

While 60 percent of women are freed from household chores completely, 18 percent are freed to some extent. About 22 percent of women have to bear the burden by themselves. Women from mother's side and husband's side generally extend help in household chores. Support in taking care of young children comes from women from mother's side to one-third of the cases. The second major source for help in caring for young children is women from husband's side.

Provider's advice and care

In both public and private institutions consent from husbands of women for induced abortion is obtained before performing abortion from little more than four-fifths of the cases as reported by women.

Refraining from arduous tasks, abstaining from sex and use of some contraception are the only suggestions given to respondents by the provider as reported by the respondents. While all women who underwent abortion in public institutions were given

some advice, 4 percent of women who had abortion in private institutions did not receive any advice from doctors. About 69 percent of women who had abortion in public institutions and 63 percent who had abortion in private institutions are asked by doctors to return to them for follow up.

Among those who had abortion in public institutions, 78 percent are either sterilized soon after abortion (22 percent) or advised to use one or other method of contraception (56 percent) by doctors. The corresponding percentages are 70, 4 and 65 among women who had abortion in private institutions.

Complications

Post-spontaneous abortion complications and differentials

Over three-fourths (78 percent) of women experienced one or other complications after two hours but within a day following spontaneous abortion. Sixty-two percent of the cases experienced some complication after 24 hours but within a week.

The percent of women experiencing complications in the period after a day but within a week among urban women is 66.0 and among rural women is 59.8. During second and third weeks after spontaneous abortion 17.8 of rural women and 14.9 percent of urban women experience complications. Higher the age at the time of spontaneous abortion or pregnancy order, the higher is the chance that a woman will experience post-abortion complication. Clearly there is association between gestational age and chance of post-abortion complications. The incidence of post-abortion complications increases with increase in gestational age at the time of spontaneous abortion. There is no difference in the incidence of complications following spontaneous abortion between public or private health care providers who provide check up service.

Excessive bleeding is the largest single symptom reported by women in any period following spontaneous abortion. Thirteen percent of women experience excessive bleeding even after a week since occurrence of the event. After 24 hours of the event but within a week 23 percent of women experience abdominal pain and 5 percent experience it even after a week. Another 11 percent of women report their experience of stomach pain. It is possible that many of these women do not distinguish lower abdominal pain from stomach pain. Again another 11 percent of women report body/hand/leg pain. Tiredness, fainting and dizziness, back/hip pain and general weakness are the other symptoms reported by about 3-5 percent of women.

Post-induced abortion complications and differentials

The percent of women experiencing one or other complication is high (80 percent) in the period after two hours but within a day following induced abortion. Sixty-three percent of women experience some complication after 24 hours but within a

week. The percent experiencing complication reduces to 2.6 after 6 weeks since induced abortions. Two percent of women experience one or the other complication permanently.

During the period after 24 hours but within a week since induced abortion the proportion experiencing complications among urban women is marginally less (62 percent) than rural women (64 percent). The proportion experiencing complication is more among women under age 25. Induced abortion done in the first trimester has less chance of leading to some complication than do those done in the second trimester. Incidence of post-abortion complication is found to be less among those done by private providers than among those done in public institutions or by others.

Bleeding and pains (abdominal pain, body/hand/leg pain and stomach pain) are the most common complications reported by many women after induced abortions. Twelve percent of women experienced excessive bleeding even after a week since induced abortions. Eleven percent of the women experienced abdominal pain even during 2nd and 3rd week following induced abortions. Another 3.5 percent reported stomach pain. Back/hip pain has become a permanent problem for 2 percent of women and white discharge has become a permanent problem to another 2 percent.

CHAPTER 1

INTRODUCTION

1.1 Incidence of Abortion in India

Every pregnancy outcome (live birth, stillbirth, spontaneous abortion or induced abortion) has its own implications for the reproductive health of woman. In the absence of effective antenatal, natal and post-natal services, pregnancy becomes a life-threatening event to women in the developing countries. Poor health of women and poor reproductive health services increases the chances of pregnancies ending in stillbirth or spontaneous abortions. In India use of contraception is on the rise and fertility is declining. Recently Marston and Cleland (2003) observe that the relationship between contraception and induced abortion may take a variety of forms when the levels of fertility are changing. There is no clear picture of the level and trend in the incidence of induced abortion in India. This is because we have information only on the number of abortions carried out in the recognized institutions but not on those taking place in unrecognized clinics and in the hands of informal providers. Though abortion is liberalized, the access to recognized clinics is limited. There are also other reasons for women preferring informal providers. There are a few small-scale studies conducted in different states in India on this topic and they suggest that foetal wastage rate and associated morbidity are high, but hard data are plagued by all sorts of errors (selectivity error, sampling error and non-sampling error). Studies on abortion, particularly induced abortion, are seriously affected by non-reporting as social stigma is attached to it.

Abortion remains a sensitive issue in most countries of the world and has only recently received international attention as a public health issue. World Health Organization (WHO) estimates that about 25 percent of all pregnancies worldwide end in induced abortions, approximately 50 million each year (Berer, 2002). Of these abortions, 20 million are being performed under dangerous conditions, either by untrained providers or using unsafe procedures or both. Deaths of women as a result of unsafe abortions in

developing countries are estimated at 80,000 annually, i.e., 400 deaths per 100,000 abortions. Of the estimated 5.3 million induced abortions in India in 1989, 4.7 million were unsafe (WHO, 1994).

The incidence of induced abortion is very difficult to measure in most countries and India is no exception. Data quality is a major consideration in studies attempting to enumerate induced abortions. Abortions, whether performed legally by trained professionals using modern technology or illegally using 'traditional methods', are subject to substantial underreporting (Huntington et al., 1993), particularly the latter ones. Abortion data come from two sources, hospital or clinical records and sample survey of women. Hospital or clinical records tend to be poor in places where abortion is illegal or highly stigmatized (Barreto et al., 1992). Field sample surveys underestimate the incidence of induced abortion even when abortion is legal (Anderson et al., 1994).

By and large, studies on abortion till around 1985 are hospital based not lending support to estimating the rate of pregnancy wastage in any specific community. They do, however, help understanding at least partially the reasons for resorting to abortion, morbidity condition associated with it and cost involved. These early studies were aimed at identifying the demographic and socio-economic characteristics of women undergoing induced abortion with the intention of emphasizing the need for popularizing contraception, as abortion was assumed to be substituted for effective contraception or used as a back up for contraceptive failure. Most of the studies listed by Karkal (1970) and WHO (1994) were not mainly intended to focus on abortion; they only produced some information on abortion in addition to their main focal theme of work. How far one can rely on these findings about abortion from these studies cannot be gauged.

Neither the rate of pregnancy wastage nor the disease burden associated with it is clearly understood as these are some of the less researched topics. While community-based studies had large yet unknown quantum of non-sampling errors, hospital based studies suffer from selectivity bias. There is, therefore, a need for a rigorous community-based survey tactfully designed to avoid giving the impression of this being a study on induced abortion alone.

1.2 The Medical Termination of Pregnancy Act, 1971

In India, the need for liberalizing abortion was recognized and debated as early as 1960s due to reports on the incidences of maternal mortality and morbidity due to illegal abortions. After two years of deliberations the Shantilal Shah Committee submitted its recommendations to the government in 1966. After a long seven years of further review and debate, the Medical Termination of Pregnancy (MTP) Act was passed in 1971. Beginning in April 1972, the Act was implemented all over the country except in Jammu and Kashmir.

The MTP Act permits termination of pregnancy in the following cases:

- a. Where the continuation of the pregnancy would involve a risk to the life of the pregnant woman or grave injury to her physical or mental health, or
- b. Where substantial risk exists of the child being born with serious physical or mental abnormality.

The act further elaborates that pregnancy (i) due to failure of contraceptive methods and (ii) the pregnancy resulting from rape could also be aborted. Only very few countries in the world had such liberal abortion policies when the MTP Act was passed in India. Recognition of women's right to seek abortion when faced with unwanted pregnancies as these could cause serious mental distress is a major step forward in the Indian Act.

The MTP Act, however, had certain restrictions that deny easy access to abortion services for women. According to the Act, only doctors trained in MTP can perform abortion procedures. For aborting pregnancies up to 12 weeks gestation, it is enough if one qualified doctor certifies. However, for pregnancies between 12 and 20 weeks, approval of two doctors is a must. In addition, abortion can be performed only in a clinic or a hospital established or maintained by the government or an institution approved by the government for this purpose. The number of approved centers was only 7121 in 1991-92 in the whole of India. These restrictions are major obstacles to easy access to MTP services. In spite of these restrictions after the introduction of the MTP Act in 1971, it is observed that the number of MTPs had increased from 0.278 million in 1976-77 to 0.632 million in 1991-92, an increase of about 8.49 percent per annum (Chhabra and Nuna, 1993).

1.3 Sex Pre-Selection Techniques and Sex Selective Abortions

Preference for sons is a long-standing cultural attribute in India. According to the National Family Health Survey-1 & 2, India (NFHS1&2, India, 1995, 2000) the sex ratio in 0-4 ages is 946 in 1992-93 and 944 in 1998-99. These surveys also provide the sex ratio at birth of 941 females per 1000 males during 1987-91 and 938 during 1993-97. If 100 girls for every 105 boys were considered to be the normal sex ratio at birth, this would mean 952 females per 1000 male births. The deviation from this may be due to either under reporting of female births or sex-selective abortion or both. Debate continues over which of these factors has the strongest influence. There are two major steps involved in sex selective abortion. First is determining the sex of the foetus and the other is aborting if the foetus is not of the desired sex.

Methods for determining the sex of a foetus became available in the 1970's. The most commonly used methods are

1. Amniocentesis (normally performed after 15-17 weeks of pregnancy).
2. Chorionic villus sampling (more expensive and normally performed around 10th week of pregnancy).
3. Ultrasound (least expensive and normally performed around 12th week of pregnancy).

After the introduction of these tests in India in the 1970's, information about and availability of the tests began to spread. The use of amniocentesis and ultrasound technology were more widespread in rapidly urbanizing areas, its use has also started spreading in rural areas (Arnold et al., 2002). For example, in one large community-based study in rural Maharashtra in India, one out of every six married women who had an abortion in the previous 18 months said the abortion had been subsequent to a sex determination test showing a female foetus (Ganatra, et al., 2001). There are also evidences that such sex selective abortions are being used predominantly by those with one or more living daughters, but no living sons (Booth et al., 1994; Khanna, 1997). It is claimed that since the introduction of the tests for sex determination of foetus the incidence of sex selective abortion, particularly female foetus, was on the rise. Though there is no doubt about the existence of sex selective abortion in India, quantum of it is yet not clearly ascertained. In response to observations of incidences of sex selective abortions in various quarters and demand for a legislation to curb the practice of sex selective abortion, the Indian government passed a legislation to combat it. Government banned sex-determination tests in government facilities in 1976. Private facilities continued to provide these services, since this ban did not cover them. Women's groups, civil liberties groups, and health organizations jointly established a forum against sex determination and sex pre-selection in 1984. This forum voiced against the growing use of sex determination tests for sex selection and demanded outlawing the use of these tests for this purpose. Consequently in 1994 the Government of India passed the Prenatal Diagnostic Techniques Regulations and Prevention of Misuse Act (PNDT Act). The major provisions of this Act are:

- ❖ Unless registered under the Act no genetic counseling centre, genetic laboratory, or genetic clinic (including clinics or laboratories or centres having ultrasound or imaging equipment) shall conduct, associate with, or help in conducting techniques that can determine the sex of a foetus.
- ❖ Even pre-conception sex-selection techniques on a woman or a man or both or on any issue, conceptus, fluid or gametes derived from either or both of them can be conducted by none including specialists in the field of infertility.
- ❖ Prenatal diagnostic technique shall be used or conducted only when the person qualified to do so is satisfied that at least one of the following conditions is fulfilled: i) the age of the pregnant woman is above 35 years; ii) the pregnant woman had two or more spontaneous abortions; iii) the pregnant woman has been exposed to potentially teratogenic agents such as drugs, radiation, infection or chemicals; iv) the pregnant woman has a history of mental retardation or physical deformities such as spasticity or other genetic disease; v) any other condition as may be specified by the Central Supervisory Board designated by the Act.
- ❖ The person conducting prenatal diagnostic procedures shall not communicate to the pregnant woman concerned or her relatives the sex of a foetus by words, signs, or in any other manner.

While on the one hand there are claims that the Act has some effect, on the other hand there are counter claims for its ineffectiveness and unabated continuation of the incidence of sex selective abortions. Arnold et al., (2002) using NFHS-2 data estimate the

incidence of sex selective abortion to be 4.1 per 1000 live births during 1996-98 and they also observe an increasing trend in the incidence. Developing a model and using the same data Krishnamoorthy (2004) estimates the incidence of sex selective abortion to be 8.2 per 1000 live births.

1.4 Reproductive Health

The International Conference on Population and Development (ICPD), Cairo, Egypt, in September 1994 drew up an ambitious and noble programme of action to make reproductive health services universally available. Reproductive health is defined as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes” (United Nations, 1994).

In India, until recently the focus of the Family Welfare Programme had been on achieving demographic targets by increasing contraceptive prevalence, notably female sterilization. There has been some success in the demographic targets set out and the birth rate has shown a declining trend. Unfortunately the health of mother, reproductive health, has been given only lip service. Stress only on the family planning dimension of reproductive health has failed in improving overall reproductive health of women. The programme has completely ignored health consequences of abortion, spontaneous and induced. Even after 1998 when the comprehensive reproductive and child health programme has been introduced many reproductive health issues are not addressed effectively.

Reproductive health conditions are generally poor in developing countries and the problem is acute among poor women. The information available on levels and patterns of reproductive health problems in India is limited. Some studies concentrated on Maternal and Child Health (MCH) care services (Bhatia and Cleland, 1995a; Bloom et al., 2001; Kanitkar and Sinha, 1989; Majumdar et al., 1994). A few community-based studies have tried to identify the prevalence of gynecological problems (Bang et al., 1989; Bhatia and Cleland, 1995b; Bhatia et al., 1997). Recently in 1998-99 the second round of National Family Health Survey was undertaken at the national level, which provided information on selected reproductive health aspects of a sample of women (NFHS-2, India, 2000). All these studies reveal a heavy burden of reproductive morbidity in India.

1.5 Pregnancy Wastage

Induced Abortion

Inducing abortion has always been practiced in societies for various reasons. Indian society does not approve premarital sex and hence premarital pregnancies. Most of premarital and extramarital pregnancies have been aborted using traditional methods for many years in the past. Induced abortions occurring within marriage is also not approved by the society. However, they were performed with the help of persons who could maintain confidentiality as it was socially stigmatized. In the absence of law

liberalizing abortion, most of the abortions are performed under unsafe and unhygienic conditions causing abortion related morbidity and in some cases even mortality. Major reasons for married women going in for abortions are (i) to limit the family size, (ii) to space between children, (iii) to select the sex of next child and (iv) failure of contraception. The most important reason for never-married, widowed and divorced women to go for abortion is to avoid out of wedlock childbirth.

From its multicentric 5 state (Haryana, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh) study, the Indian Council of Medical Research (ICMR) provides a combined estimate of 19.4 induced abortions per 1000 pregnancies and 42 spontaneous abortions per 1000 pregnancies during 1983-85 (Indian Council of Medical Research, 1988). The induced abortions of about 20 per thousand pregnancies are certainly an underestimate. Nearly half of the world's unsafe abortions take place in Asia, almost one-third in South Asia alone (Population Council, 2000). It was estimated that in India alone 11.2 million abortions occurred in 1991 out of which 6.7 million were induced abortions implying 452 abortions per 1000 live births and 270 induced abortions per 1000 live births (Chhabra and Nuna, 1993). These are only crude estimates and they vary widely. There is no reliable estimate of the pregnancy wastage in India or for any part of India. The NFHS-1, India (1995) and NFHS-2, India (2000) estimate the induced abortion rate as 1.3 per 100 pregnancies during the period 1992-93 and 1.7 in 1998-99. They seem to be gross underestimates. Varkey et al., (2000) observe that most abortions are carried out in the first trimester pregnancy and unqualified practitioners performed 65 percent of terminations. They are done mostly for spacing and limiting family size. Dilatation and Curettage (D&C) is the method used to terminate 76 percent of the pregnancies.

Spontaneous Intrauterine Mortality

Clinical studies suggest that only about 40 percent of fertilized ova result in a live birth. According to James (1970) 35 percent of all fertilized ova are lost before the first missed period. In addition a substantial proportion of pregnancies end in spontaneous abortion during early weeks of missed period, which are confused with delayed menses. Intrauterine mortality includes both spontaneous abortions and stillbirths, but exclude embryonic deaths before the first missed menses, as they are very difficult to observe. A foetal death before twenty-eight weeks of gestation - usually measured from the first day of the last menstrual period - is called a spontaneous abortion and it is called a stillbirth if it occurs later.

A number of attempts have been made to estimate the risk of intrauterine mortality (Leridon, 1977; WHO, 1970). They all suffer from one or other shortcomings. Underreporting of foetal deaths, especially deaths with short gestation period in retrospective studies, unrepresentative study population, misreporting of delayed menses or induced abortion as spontaneous abortion, errors in statistical estimation procedures and sampling errors are some of the frequently encountered problems in these studies.

According to Bongaarts and Potter (1983) the average risk of an intrauterine death per 100 pregnancies in progress at 4 weeks from the last menstrual period is given in the following Table 1.1. Among pregnancies with at least four weeks of gestation 20 percent

result in intrauterine deaths. The risk is very high at early months of gestation and declines sharply as gestation progresses.

Table 1.1 Model distribution of spontaneous abortion by gestational age

Gestational age (weeks)	Intrauterine mortality (%)
4-7	8.1
8-11	5.9
12-15	2.9
16-19	1.0
20-23	0.6
24-27	0.3
28-31	0.2
32-35	0.2
36-39	0.3
40+	0.5
Total	20

Source: Bongaarts and Potter, 1983, Pp 39.

There are indications that 10-15 percent of clinically recognized pregnancies end in spontaneous abortions (Kline et al., 1989). The range may even be marginally wider depending on demographic, genetic and environmental characteristics of women. Foetal death rates in Punjab (India), Matlab (Bangladesh) and Kauai (Hawaii, USA) are provided in the following Table 1.2.

Table 1.2 Foetal deaths per 1000 pregnancies in progress at the beginning of each trimester in Punjab, Matlab and Kauai

Gestational age (since last menstrual period)	Punjab (Potter et al., 1965)	Bangladesh (Pebley et al., 1985)	Kauai (French and Bierman, 1962)
4-15 weeks	72	83	208
(16-27 weeks)	35	30	25
(28 – 44 weeks)	35	74	16
Total	136	176	237

Source: Pebley et al., 1985. Pp 430.

With the available limited evidences Bongaarts and Potter (1983) conclude that the difference in intrauterine mortality between developing and developed countries may be quite small. Reviewing some retrospective studies conducted in developing countries Leridon (1977) comes to the conclusion that the foetal mortality rate is in the same 12-15 percent range. A reliable prospective study in Pakistan also estimates intrauterine mortality at 17.6 percent after the sixth gestational week (Awan, 1975). This estimate is close to the levels observed in the United States and another investigation in Bangladesh (Chen et al., 1974; Pebley et al., 1985).

As biological causes presumably operate relatively independently from social, economic and health factors (except for a few specific diseases), it can be expected that there is relatively little variation in early foetal mortality that constitutes the bulk of all intrauterine mortality. Foetus becomes more susceptible to factors such as infections and the general health of the mother in the later months of gestation (Yerushalmy et al., 1956). Stillbirth rates tend to be higher by about 3 percent in poor developing countries (WHO, 1970). However, its effect on the overall intrauterine mortality is very less.

There are a few studies that provide estimates of spontaneous abortions and stillbirths in India. The NHFS-1 & 2, India (1995, 2000) estimates spontaneous abortions as 4.5 percent of all pregnancies during 1992-93 and 4.4 percent during 1998-99. They also show a stillbirth rate of 2.3 and 2.0 per 100 pregnancies respectively. A hospital-based study conducted in Mumbai during 1987-91 also shows the same level (2.34 percent) of stillbirth rate (Nayak and Dalal, 1993). The common factors responsible for stillbirths are premature labour, foetal asphyxia and maternal diseases.

1.6 Pregnancy Outcome Related Morbidity and Mortality

Induced abortion does affect women's survival and health. The risk involved in inducing abortion depends upon many factors like age of woman, physical and mental condition of the woman, gestation period, place where abortion is performed, method used for abortion, person who performs the abortion, etc. In the recent past, there has been rising interest in the field of abortion research due to high incidence of maternal deaths arising out of unsafe abortion practiced in developing world. In India the percentage of maternal deaths attributable to abortion ranges between 10 and 18 (Johnston, 2002). A large proportion of maternal deaths are claimed to be associated with clandestine abortion practices under unsafe conditions or post-abortion complications (Chhabra and Nuna, 1993). Further it has been noted that a large proportion of abortions are performed after 18 weeks of pregnancy because by the time a woman decides to go for abortion and identifies a place for abortion the pregnancy is in advanced stage. Maternal mortality is found to be highly positively related to gestational age (Ganatra, 2001).

Bhat et al., (1995) estimated a maternal mortality ratio of 580 deaths per 100,000 live births in India during 1982-86. UNFPA estimates that 453 women die due to maternal causes for every 100,000 live births in India each year. There is also substantial variation between states. Chhabra and Nuna (1993) estimate that 15 percent of maternal deaths in India are the result of unsafe abortion. The percentage of maternal deaths ascribable to abortion ranges between 10.8 and 18.1 (Johnston, 2002). Further it is likely that a large proportion of women face complications and morbidity related to pregnancy and pregnancy termination.

Reproductive morbidity refers to all abnormalities related to the reproductive system not necessarily as a consequence of reproduction. Obstetric/maternal morbidity, gynecological morbidity and contraceptive morbidity are the three broad categories of reproductive morbidity.

“1. *Obstetric/maternal morbidity*, which covers morbidity in a woman who is, or has been, pregnant from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

2. *Gynecological morbidity*, which covers any condition, disease or dysfunction of the reproductive system that is not related to pregnancy, abortion or child birth, but may be related to sexual behaviour.

3. *Contraceptive morbidity*, which covers conditions that result from efforts (other than abortion) to limit fertility, whether they are traditional or modern methods.”(van de Wijgert and Elias, 2002).

Several studies have noted though not with accuracy high levels of maternal mortality. In the case of maternal morbidity no reasonable estimate of prevalence is available. From a field based study in one small village in Rajasthan it is found that for every maternal death 16 women suffered from illness during pregnancy, childbirth or within six weeks after delivery (Datta et al., 1980). In the recent past, a few community-based studies have been conducted on maternal morbidity (Bhatia and Cleland, 1995a; Srinivasan et al., 1997). The major symptoms of morbidity observed are unconsciousness, excessive vomiting during antenatal period, prolonged labour and excessive bleeding during intrapartum period. Some morbidities that can be detected or confirmed only by examination (for example: hypertension, pulmonary tuberculosis, prolapse of uterus, vaginal infections etc.) and some that can be detected only by history unless they are actually present at the time of examination (example: fits and convulsions) are not easily detectable by community surveys. Recently held nation wide Reproductive and Child Health Survey (RCH, 2001) provides information on complications related to pregnancy and delivery. It is observed that in India 64, 37 and 44 percent of women experienced at least one of pregnancy, delivery and post delivery complications respectively. The complications experienced by women are given in the Table 1.3 reproduced from the source.

Table 1.3 Complications during pregnancy, delivery and after delivery in India, RCH, Phase I & II

Complications	Percentage of women experiencing complication
Pregnancy complications	63.6
Swelling of hands and feet	22.9
Paleness	18.8
Weakness and tiredness	53.0
Dizziness	58.3
Visual disturbances	13.4
Bleeding	3.4
Convulsions	3.8
Weak or no movement of foetus	3.3
Abnormal presentation	2.3
Other	12.0
Delivery complications	37.0
Premature labour	16.0
Obstructed labour	17.8
Prolonged labour (more than 12 hours)	13.3
Breech presentation	2.6
Other	4.1
Post delivery complications	44.4
High fever	19.5
Lower abdominal pain	28.6
Foul smelling/vaginal discharge	9.2
Excessive bleeding	12.4
Dizziness, severe headache	18.7
Other	2.7

Source: RCH (2001). Pp. 50.

Complications arising out of spontaneous abortions and unsafe induced abortions pose serious health problem to women. Unsafe abortion is defined as a procedure for terminating a pregnancy either by a person lacking the necessary skills or in an environment lacking the minimal medical standards, or both (WHO, 1992). Globally an estimated 46 million induced abortions are performed annually (Alan Guttmacher Institute, 1999). About 20 million of these are unsafe and 95 percent of these occur in the developing world (WHO, 1998). Unsafe abortion accounts for an estimated 13 percent of pregnancy related deaths accounting approximately 67,000 deaths of women every year (WHO, 2003). Unsafe abortion also causes long-term consequences such as chronic pain, pelvic inflammatory disease, tubal occlusion and secondary infertility. According to

the World Health Organization 10-50 percent of women who have an unsafe abortion require medical care and even among those experiencing spontaneous abortion some need medical attention. There are indications that in India, traditional methods of induced abortion have given way to modern methods and among modern methods, D&C is still the main surgical method of abortion being used in both public and private sectors (Ramachandar and Pelto, 2002).

1.7 Maternal Health Care Services and Cost

In most developing country settings like India pregnancy and childbirth are accepted as normal events in the life of a woman. Most of the problems associated with pregnancy are seldom taken seriously. Health care services in India lay emphasis on the antenatal, delivery and postnatal care but not on abortion (induced or spontaneous) care. Achievements even in services emphasized by the programme are not satisfactory. Even as late as 1998-99 only 33.6 percent of deliveries take place in health institutions (NFHS-2, India, 2000). Only 16.5 percent of mothers receive postnatal checkup service within two months of birth (Table 1.4).

Table 1.4 Antenatal care provider, place of delivery, assistance during delivery and postnatal care, India, NFHS-1 (1995) and NFHS-2 (2000)

Health Care Services	NFHS-1	NFHS-2
Antenatal care provider		
At home from health worker	12.8	5.8
Doctor	39.8	48.6
Other health professional	9.3	10.9
Traditional birth attendant/other	0.3	0.2
No antenatal checkup	36.8	34.0
Place of delivery		
Institutional delivery	25.5	33.6
Home delivery	74.5	66.4
Assistance during delivery		
Doctor	21.6	30.3
Nurse/midwife	12.6	11.4
Traditional birth attendant	35.2	35.0
Relative/other	29.5	22.4
Postnatal care		
Percent of mothers receiving postpartum checkup with in two months of birth	---	16.5

Source: NFHS-1, India (1995); NHHS -2, India (2000).

Health hazards of unsafe induced abortions and unanticipated spontaneous abortions are major health issues facing women in India. There are no hard data on the complications experienced due to abortions. In principle, women can access safe abortion services by trained medical persons. In practice, limited access to authorized

abortion providers, the threat of forced contraceptive acceptance, unfounded fear of financial costs associated with legal abortion, stigma associated with induced abortion, and low levels of awareness regarding the legality of the procedure bar women from safe abortion services (Khan et al., 1999; Sinha et al., 1998). As a result, women often resort to unapproved untrained practitioners operating under unsafe conditions. The consequences of abortions performed under such circumstances range from maternal death to chronic reproductive tract morbidity.

The cost to a woman for abortion services is likely to be different depending on some factors such as marital status, the number of weeks since conception, the method used for abortion, the kind of anesthesia used, whether linked to acceptance of some contraception, whether it is a sex selective abortion, the location of the clinic, whether the provider and/or clinic is registered, whether hospitalization is required, the nature of competition and so on. In India, a multi-centric study of abortion providers in six states attempted to obtain costs from private and public providers of abortion services. In Kerala the cost ranged from an average of Rs.1,266 for under 12 weeks to over Rs.5,000 for over 20 weeks in the private sector which are free in the public sector (Ramanathan et al., 2003). Whereas in Haryana, the public sector costs ranged from Rs.9 for under 12 weeks to Rs.80 for over 12 weeks of gestation period, while in the private sector the range was from Rs.300 to Rs.3,000 (Barge et al., 2003). In Madhya Pradesh the public sector cost ranged from an average of Rs.209 under 12 weeks of pregnancy to Rs.775 for up to 20 weeks, and in the private sector it ranged from Rs.389 under 12 weeks to Rs.1583 for over 20 weeks (George, 2003). CORT (1995-97) conducted studies of abortion providers in rural Uttar Pradesh, Maharashtra Gujarat and Tamil Nadu. According to this study the cost to the client ranged from Rs.135 to Rs.534 (average Rs.370) for service from public providers and from Rs.394 to 649 (average Rs.497) for service from private providers. A similar study in Maharashtra in 1999 computed the average cost of abortion at Rs.991 (Bandewar and Sumant, 2002). A qualitative study of women in Maharashtra shows that while regular abortion costs between Rs.100 to Rs.1,200 depending on whether it was a public or private facility, the cost went up to Rs.5,000 for sex selective abortions (Gupte et al., 1997).

1.8 General Profile of Tamil Nadu

As the present community-based survey is in Tamil Nadu state situated in eastern side of southern extreme of peninsular India, a brief description of its population and a review of earlier works on pregnancy terminations and related complications are in order. During the British period, most of Tamil Nadu was a part of the large Madras Presidency, which also included large portions of present Andhra Pradesh state, and parts of Kerala and Karnataka states. The Madras state (renamed as Tamil Nadu in 1969) was formed in November 1956 during the reorganization of Indian states on linguistic basis.

Tamil Nadu extends between 8.5' and 13.35' North latitudes and 76.15' and 80.20' East longitudes. It is bounded by the Bay of Bengal in the East, the Indian Ocean and the Arabian sea at the Southern tip, the state of Kerala in the West and the states of

Karnataka and Andhra Pradesh in the North. It is spread over an area of 130,058 sq. kms. There were 13 districts in the state at the time of reorganisation, but for administrative convenience, the larger districts have been subdivided. As a consequence at present the state has 31 districts.

Tamil Nadu’s language, culture and civilization are rooted in its Dravidian past. Tamil Nadu was ruled by three major dynasties – Chola, Pandya and Chera – around the beginning of the Common Era. Tamil is the official language of the state spoken by 87 percent of the population. Other major languages are Telugu (seven percent), Kannada and Urdu (two percent each) and Malayalam (one percent). Hindus are more predominant in the state. Christians and Muslims are a little over five percent each. About 19 percent of the population belongs to scheduled castes. Scheduled tribe constitutes barely one percent of the population.

Tamil Nadu has a population of 62.11 million as per 2001 Census. The decadal percent increase in population is 11.2 (1991-2001). Tamil Nadu has the second lowest population growth rate among large states in the country. The population sex ratio is 1014 males per 1000 females in 2001. The level of urbanization in the state (43.8 percent) is much higher than the all India figure of 27.8 percent (Director of Census Operations, Tamil Nadu, 2001a). The population density is 478 persons per sq. km.

Table 1.5 Basic Demographic Indicators of Tamil Nadu

Total population (000,000) ^a	62.1
Percent Decadal Population Growth 1991-2001 ^a	11.2
Density (population / sq.km) ^a	478
Sex ratio (males per 1000 females) ^a	1014
Literacy rate (literate per 100 persons aged 7 or more) ^a	
Total	73.5
Male	82.3
Female	64.6
Percent urban ^b	43.9
Crude birth rate (2001) ^c	19.3
Crude death rate (2001) ^c	7.7
Infant mortality rate (2001) ^c	51
Couple Protection Rate (1999) ^d	50.8

Sources: ^a Director of Census Operations, Tamil Nadu, 2001a.

^b Director of Census Operations, Tamil Nadu, 2001b.

^c Registrar General, India, 2003.

^d NFHS-2, Tamil Nadu, 2001.

The demographic indicators show that Tamil Nadu has reached the last stage of demographic transition. The crude birth rate is 19.1 per 1000 population as estimated by the Sample Registration System in 2001, the crude death rate is 7.7 per 1000 population and the infant mortality rate is 49 per 1000 live births (Registrar General, India, 2003).

(See Table 1.5). Consistent with low fertility, the singulate mean age at marriage for girls is 20.9 (computed from NFHS-2 data) and the couple protection rate in Tamil Nadu is 50.8 percent in 1997-98 (NFHS-2, Tamil Nadu, 2001).

Tamil Nadu is one of the educationally more advanced states in the country. According to the 2001 Census, the literacy rate among the population age seven and above was 73 percent, compared with 65 percent for India as a whole. The literacy rates are 82 percent for males and 65 percent for females in Tamil Nadu, compared with 76 percent for males and 54 percent for females in India.

Tamil Nadu is considered to be one of India's economically and industrially more developed states. Still agriculture is its economic base and it is one of the largest producers of rice in the country. In addition to rice, some other cereals, pulses, cash crops such as sugarcane and cotton and plantation crops like tea and coffee are also produced in the state. At the time of the 2001 Census, the agricultural sector provided livelihood to 50 percent of the working population in the state as cultivators or agricultural labourers (Director of Census Operations, Tamil Nadu, 2001b).

The state is also quite well developed industrially. The manufacturing industries in the state include spinning and weaving, cement, fertilizers, sugar, leather, etc. About 29 percent of the state's income during 1988-89 came from mining and manufacturing (CMIE estimates). Even though Tamil Nadu has made moderate economic progress in the recent decades, the state is not as economically prosperous as Punjab, Haryana or Maharashtra. The average annual per capita gross domestic product of the state increased from Rs. 9,979 in 1993-94 to Rs.14,911 in 2001-02 at constant (1993-94) prices or Rs.23,806 at current prices compared to the national per capita gross domestic product of Rs.22,141 in 2001-02 at current prices (CMIE, 2004). According to the Planning Commission the state ranks third among large states in the Human Development Index in 2001 (Planning Commission, 2002).

Transport and communication facilities are also well developed in Tamil Nadu. All-weather roads connect more than 90 percent of villages. The state has a long coastline with two major ports, Madras and Tuticorin besides a number of fishing harbors.

The National Health Policy approved by the parliament in 1983 governs the delivery of health services in the state also. Private institutions also cater to the health needs of people along with main provider, the government. Maternal and Child Health including pre-natal, natal and post-natal services and immunization constitute the important component of the primary health care. The Universal Immunization Programme (UIP) has been operating in the state since its inception in 1985-86. The safe motherhood initiatives including tetanus immunization for pregnant women have also been successful. As per NFHS-2 only 1.2 percent of pregnant women in Tamil Nadu did not receive any antenatal care, only 2.2 percent of pregnant women did not receive Tetanus Toxoid vaccination, 83.7 deliveries were attended by doctors or trained birth attendants, 98.6 percent of babies received BCG, 96.7 percent of children

received three doses of DPT and 98 percent of children received three doses of Polio (NFHS-2, Tamil Nadu, 2001). Overall, the performance of maternal and child health services in the state have been above all India level. The public expenditure on health services during 1991-92 was about seven percent of the state budget (National Council of Applied Economic Research, 1994). The per capita public expenditure on health was Rs. 65.

Since inception in 1951 as purely a demographic programme, the national family planning programme has been functioning in Tamil Nadu. In 1963 extension approach has been introduced in the programme. Frustrated by poor performance of the programme, method specific targets were introduced in 1969. Soon maternal and child health programme and family welfare programme were integrated. The Child Survival and Safe Motherhood programme was implemented in 1992. Consequent on the International Conference on Population and Development (ICPD) in 1994 at Cairo, Government of India keeping with its commitment abolished target approach in 1996 and introduced community needs assessment approach. In 1998, comprehensive Reproductive and Child Health (RCH) programme was operationalized. The state programme closely followed the national programme.

Over the years, the Government of Tamil Nadu implemented other social welfare programmes. The ones that have direct relevance to the present topic of interest are the following. Mid-day Meal Scheme under which every school child is provided with nutritious mid-day meal in the school with the aim of improving the nutritional status of children and increasing school enrolment. With the assistance from World Bank, Tamil Nadu Integrated Nutrition Programme (TNIP) has been launched with the goal of improving the nutritional status of children aged six months to two years. In addition by another scheme every girl child is given Rs.5,000 who completes at least eight years of schooling at the time of her marriage. 'Cradle Baby Scheme' has been introduced to curtail the practice of female infanticide. In order to eliminate the practice of infanticide through another scheme called the 'Girl Child Protection Scheme', the second girl child in the family is issued a bond worth Rs.2,000 at the time of birth, Rs.250 at her first birth day and Rs.250 when she enters school. There are also a number of programmes initiated in smaller areas with the help of non-governmental organizations with foreign or local supports. For example in two districts maternal and child health services are enhanced with Danish assistance.

1.9 Abortion Incidence in Tamil Nadu

Tamil Nadu is one of the states where induced abortion rate is considered to be high. But clear evidences are lacking. One of the earliest studies reported that the abortion ratio (number of abortions per 1000 live births) is 214 among Vellalas (land owning community), 72 among Scheduled Caste (socio-economically poor community) women and 97 among non-Scheduled Caste women during March 1969- February 1970 (Pillai et al., 1974). This was the time when the higher caste and landed gentry wanted to control their fertility but contraceptive technologies and accessibility to them were

limited. Further the study was small and in an area where the landed Vellalas are predominantly settled. In the same area, subsequently, the same institute conducted another large-scale study. It covered 22,939 pregnancies and found only 467 (2 percent) abortions; both induced and spontaneous (Gunasekaran and Kurup, 1976). Women in the same study area were subsequently followed every six weeks to register new pregnancies and identify outcomes of pregnancies enrolled earlier in previous visits. Such an intensive follow up yielded 5.7 induced abortions per 100 pregnancies among Vellalas, 2.3 among Scheduled Caste women and 3.4 among 'Other Hindus' (Muthiah, 1990).

State level estimates on pregnancy outcome are available from five sources. The results of these studies are given in Table 1.6. This set of data provides estimates of proportion of all pregnancies to sample women till the date of survey. Only in the RCH survey the estimates are based on pregnancies occurred between 1996 and the date of survey. A perusal of the results of these studies given in the table suggests that the estimates by RCH study are gross underestimates. The studies indicate that the percent of pregnancies ending in stillbirth, spontaneous abortion and induced abortion is about 14. The percent of pregnancies ending as spontaneous abortion is about 6.5, as induced abortion is about 5.0 and as stillbirth is about 2.5.

Table 1.6 Percent distribution of all pregnancies of ever-married women by outcomes

Pregnancy outcome	NFHS-1, Tamil Nadu, 1992	Ramanujam and Rajamanickam 1995	RCH Phase 1 1998	NFHS-2, Tamil Nadu, 1999	Multiple Indicator Survey 2000
Live birth	86.0	86.2	91.9	86.2	87.6
Stillbirth(SB)	2.7	2.4	1.5	2.5	
Spontaneous abortion(SA)	7.0	6.5	4.0	6.2	
Induced abortion(IA)	4.3	4.9	2.6	5.2	
SB+SA+IA	14.0	13.8	8.1	13.9	12.4

Sources: NFHS-1, Tamil Nadu (1994) (Ever married women aged 15-49)
Ramanujam and Rajamanickam(1995) (Ever married women aged 15-49)
RCH (2000) (Percent distribution of pregnancy outcome among pregnancies occurred after 1-1-1995 to currently married women 15-44)
NFHS-2, India (2000) (Ever married women aged 15-49)
Multiple Indicator Survey (2001) (Ever married women aged 15-49)

Shah Committee's assumption of 15 induced abortions per 100 pregnancies is well above all the estimates provided by surveys (Government of India, 1966). This disparity may be due to low actual level of induced abortion in Tamil Nadu or due to under-enumeration of induced abortions or both. Therefore, there is an urgent need to obtain reliable estimate of pregnancy wastage.

Though the Medical Termination of Pregnancy (MTP) Act, 1971 liberalized induced abortions, still it is not accepted by the society at large as a desirable act. The procedures adopted at the Government clinics have less room for confidentiality. Hence a substantial proportion of women seek induced abortion from doctors not trained in conducting MTP or from indigenous medical practitioners who maintain confidentiality. As the level of induced abortion itself is not known, there is no way to know the percent of abortions being carried out under unsafe conditions.

According to the Reproductive and Child Health Project (RCH, 2000) twenty-eight percent of women at the national level who had induced abortion reported one or more symptoms of abortion complications. Even this could be an underestimate, as the survey underestimated the incidence of induced abortion itself. Further, there could be underreporting of complications due to induced abortions too, particularly those complications arising out of illegal abortions. The percentage of women experiencing abortion complications could be much higher among those who got it done by untrained or indigenous medical practitioners.

Generally, women's health including reproductive health receives low priority within the household, as women's status is very low. So morbidity burden particularly due to pregnancy wastage could be enormous. Lack of access to health care (abortion care) services adds to the severity of the problem. After the introduction of MTP Act in 1972 in India reported MTP cases in Tamil Nadu have been on the increase. According to the available statistics, the number of approved institutions providing MTP facilities in Tamil Nadu has increased from 80 in 1975-76 to 741 in 1997-98 and the number of MTP cases from a mere 19,213 reported in the year 1975-76 has gone up to 47620 in 1997-98. These figures are only the number of abortions carried out in approved centers (Table 1.7). It is surprising that even after thirty years of legalization of MTP its availability in rural areas is very limited. Recently there is a growing realization of urgent need to increase safe MTP facilities both in rural and urban areas, so that a woman could have access to safe and hygienic abortion facilities, if she desires to terminate her pregnancy. Private practitioners also conduct abortions and there is no estimate of the quantum of such abortions. Majority of these cases are done in rural areas having inadequate facilities and hence done under unhygienic conditions by unqualified providers. High levels of maternal morbidity and mortality are associated with these illegal abortions carried out by untrained village providers. The Health and Family Welfare Programme and the health policies, though pays greater attention to antenatal, delivery and postnatal services and maternal and child immunization, are silent about abortion and its care.

Table 1.7 Trends in registered abortions in India and Tamil Nadu

Year	India	Tamil Nadu	Percent
1975 – 1976	214,007	19,213	9.0
1976 – 1977	278,013	37,945	13.6
1977 – 1978	241,724	24,456	10.1
1978 – 1979	312,754	34,418	11.0
1979 – 1980	358,002	32,699	9.1
1980 – 1981	385,749	36,494	9.5
1981 – 1982	426,551	42,364	9.9
1982 – 1983	506,230	44,785	8.9
1983 – 1984	518,608	47,976	9.3
1984 – 1985	573,129	65,754	11.5
1985 – 1986	582,369	63,279	10.9
1986 – 1987	584,218	61,825	10.6
1987 – 1988	583,857	58,654	10.1
1988 – 1989	582,156	54,452	9.4
1989 – 1990	595,969	54,195	9.1
1990 – 1991	580,744	51,263	8.8
1991 – 1992	632,526	49,859	7.9
1992 – 1993	605,116	45,861	7.6
1993 – 1994	609,915	42,364	7.0
1994 – 1995	625,931	41,122	6.6
1995 – 1996	566,451	42,314	7.5
1996 – 1997	538,075	43,066	8.0
1997 – 1998	510,489	47,620	9.3

Source: Government of India (Various years).

1.10 Conclusion

All the above indicate that it is now time, though late, to embark on a community-based survey on induced abortion carefully designed to minimize the non-sampling errors to estimate the incidence of various pregnancy outcomes. Indirect estimates have not been reliable in Indian condition. An attempt has been made to estimate induced abortion based on residual method and it is found that the estimate is sensitive to errors in input data in other indices of the proximate determinants model (See Appendix A). Maternal morbidity associated with outcomes, cost and care are also equally important as that of the incidence. Further, a study of this kind would be of great utility only when reproductive health problems and health seeking behavior are combined to facilitate policy and program relevant findings. Such a survey should also be broad based so as to provide policy directions on issues like access to safe and legal abortion, causes and health consequences of induced and spontaneous abortions and repeated occurrences of them to women. Reliable information on nature and extent of abortion morbidity, changing causes of induced abortion such as son preference, sex selection, knowledge of and access to service providers, etc. will also help in policy and programme planning. The present study aims at these.

CHAPTER 2

METHODOLOGY

This chapter presents the methodology adopted in the study. Aims and objectives, sample design and size, tools used for data collection, recruitment of staff, preparatory work, training of investigators, ethical issues, actual data collection process and details of sample implementation are all described.

2.1 Aim and Objectives

The ultimate aim of the survey is to study pregnancy outcome and related issues with the view to provide feedback to the policy makers and the society at large to improve women's access to safe and affordable abortion care services and crisis management of spontaneous abortions. It is also aimed to examine women's reproductive health problems attributable to pregnancy outcome, health care seeking behaviour and the cost and care associated with abortions.

The specific objectives are:

1. To arrive at period and cohort estimates of pregnancy wastage, both spontaneous and induced.
2. To find whether there are repeat abortions – spontaneous and induced.
3. To assess the burden and nature of abortion related morbidity.
4. To document the reasons for seeking induced abortion.
5. To find out the expenditure pattern on spontaneous and induced abortions.
6. To know the care received at the time of pregnancy termination (induced and spontaneous).

To address the aforesaid objectives data on the following are to be obtained.

- 1) Demographic and socio-economic profile of the family/household and women.
- 2) Pregnancy history of a sufficiently large sample of women with details on pregnancy terminations during recent years.

- 3) Reasons (causes) of pregnancy wastage, providers of service, use of contraception, incidence of repeat abortions – induced and spontaneous, and such other details.
- 4) Providers, procedures and cultural practices relating to care during pregnancy and during pregnancy termination.
- 5) Socio-economic and household service support enjoyed during these events.
- 6) Morbidity (nature/type), if any, resulting from pregnancy wastage.
- 7) Household expenditures (both direct and indirect) on these events.
- 8) Persons involved in decision regarding abortion.

2.2 Sample Size and Sampling Design

Sample Size

In order to estimate the rate of pregnancy wastage in Tamil Nadu, it is necessary that a probability sample of pregnancies be drawn from the state. The sample size depends on the sampling error that could be tolerated and, of course, on resources constraints. In a simple random sample, the standard error of the estimate of the rate is given by

$$\sqrt{[p(1-p)/n]}.$$

If the error in estimating 'p' is to be less than a specified amount 'd' with 95 percent confidence, then the sample size 'n' under simple random sampling has to be at least

$$1.96^2 p(1-p)/d^2.$$

Earlier studies in Tamil Nadu, though not mainly aimed at estimating pregnancy outcome, have provided some estimates. None of these estimates exceeded 7 induced abortions, 7 spontaneous abortions and 3 stillbirths per 100 pregnancies. Together pregnancy wastage estimate never exceeded 17 percent. There are, of course, reasons to doubt that these could be underestimates as these studies could have under-enumerated these events both because of lack of efforts to improve enumeration of these events and underreporting of these events by the respondents. Hence, there is a widely held view, though not substantiated, that the percentage of pregnancies wasted could be as high as 30 percent. At least for the purpose of estimating the sample size, we assume that the pregnancy wastage is around 30 percent.

If 'd' = 0.01 (error to be tolerated with a confidence level of 95 percent) and 'p' is 0.3, then 'n' must be greater than 2,100. Thus, at least 2,100 pregnancies must be covered so that we can be 95 percent confident that the error will be less than 0.01.

It is assumed that 70 percent of the pregnancies end in live births and therefore, 2,100 pregnancies imply 1,470 (= 2,100 x 0.7) live births. If we cover a period of three years, 490 births (=1,470/3) per year are to be expected. Assuming a birth rate of 20 per thousand population in Tamil Nadu, coverage of 24,500, (= 490 x 1,000/20), population would yield 490 births in a year. At the rate of 5 persons per household, this amounts to 4,900 households.

Some allowance must be made for non-response to household schedules and again to woman's schedules. Since the issue to be investigated is sensitive, a higher than normal non-response is to be assumed.

Hence, we assume a non-response rate of about 10 percent. The survey should therefore aim to cover 5,500 households with the expectation that about 5,000 households will be covered, with a population of 25,000. It is expected that there would be about 5,000 married women of reproductive age in these households and counting pregnancies to these women over a three year period is likely to yield about 2,100 pregnancies.

Sample Design

Note that the estimate of sample size is for a simple random sample. But selecting a simple random sample from the state is operationally not feasible. It would be convenient to adopt a two-stage design. It is proposed to select 110 Primary Sampling Units (PSUs) and about 50 households from each PSU. First, the state is to be divided into 10 strata, 5 regions and urban/rural area within each region. All the districts (21 in number) are grouped into five regions as done in the National Family Health Survey-2 (NFHS-2, Tamil Nadu, 2000). The five geographic regions with the districts falling in them are given below (Table 2.1). The names of the districts are as in the 1991 Census.

Table 2.1 Regions and districts

Region	Districts*
1	Coimbatore Dindigul Anna (Dindigul) Madurai (Madurai and Theni) Periyar (Erode) The Nilgiris.
2	North Arcot-Ambedkar (Vellore) Dharmapuri Thiruvannamalai-Sambuvarayar (Thiruvannamalai) Salem (Salem and Namakkal) Tiruchirappalli (Tiruchirappalli, Karur and Perambalur).
3	Kanniyakumari.
4	Chengalpattu-MGR (Kanchipuram and Tiruvallur) South Arcot (Cuddalore and Villupuram) Thanjavur (Thanjavur, Nagapattinam and Tiruvarur) Chennai
5	Pudukkottai Pasumpon Muthuramalinga Thevar (Sivagangai) Kamarajar (Virudhunagar) Ramanathapuram Chidambaranar (Toothukudi) Tirunelveli Kattabomman (Tirunelveli).

* Names are as in the 1991 Census. Between 1991 and the time of survey there were bifurcation or trifurcation of some districts, which are also given in parentheses.

In each region urban and rural areas are separated and thus we have 10 strata. As Chennai consists of only urban area, the entire population of Chennai falls into one stratum. At the time of sample selection 2001 Census results on urban and rural areas are not available. As per the 1991 census, the proportion of urban population in Tamil Nadu is 34.15. Hence out of a total of 110 PSUs, the PSUs to be selected from urban area are 38 and the rest 72 to be from rural areas. The number of PSUs to be selected is distributed among the strata proportionate to the population size. The distribution is given in the following Table 2.2.

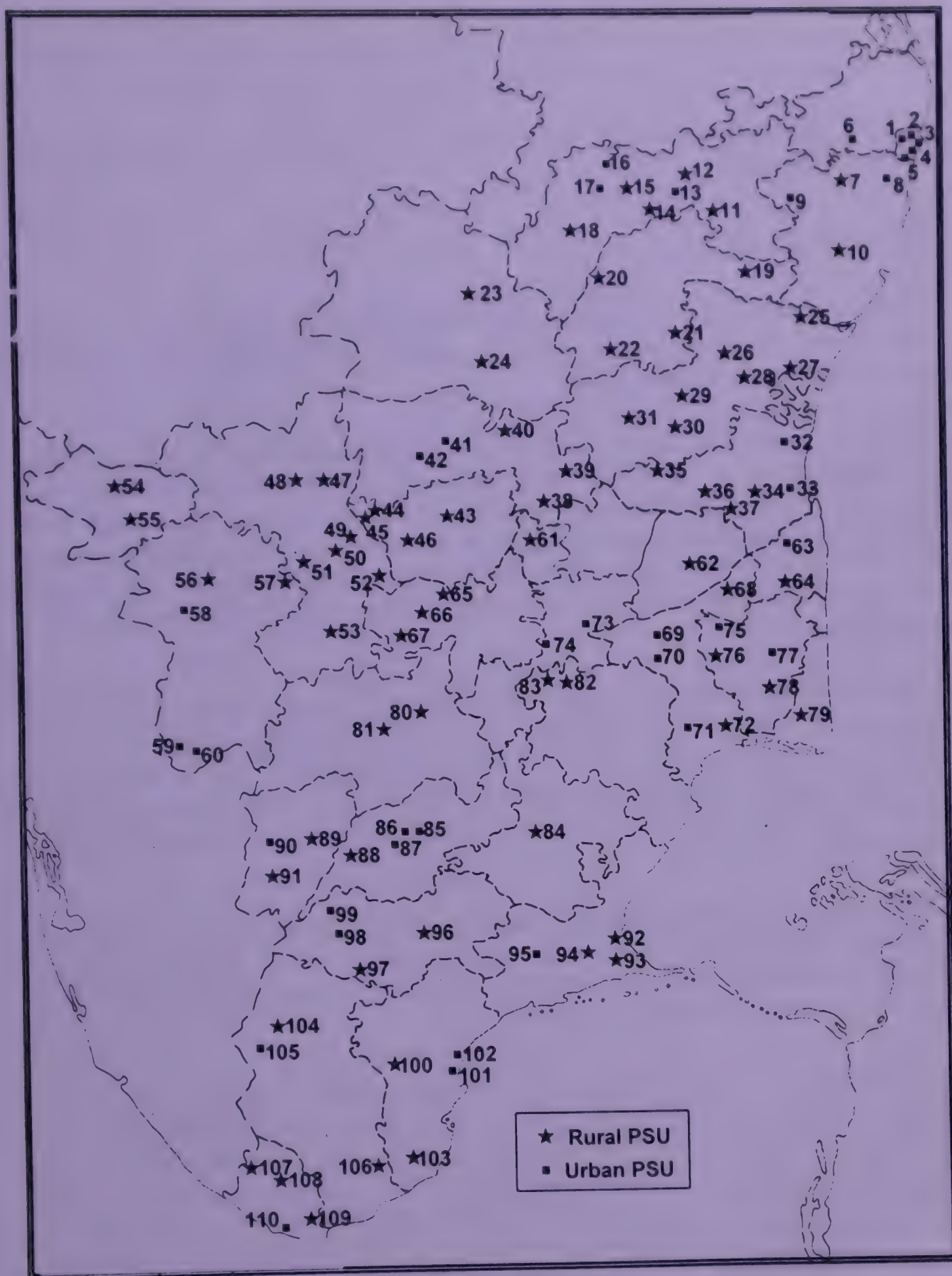
Table 2.2 Number of primary sampling units in urban/rural areas by region

Region	Rural	Urban	Total
1	14	9	23
2	23	7	30
3	3	1	4
4	20	15	35
5	12	6	18
Total	72	38	110

In rural areas, first all villages with households of 5 or less were removed. Further all villages with households less than 50 are merged with adjacent village. These villages are then sorted by population size. Then cumulative population is computed. Finally, the desired number of villages is randomly selected with probability proportion to size using the information on the cumulative population in each stratum.

In each selected village, house listing is to be carried out. Once the households are listed and ordered serially, systematic sample of 50 households are to be selected from within the listed households. In case when the households in the chosen area (urban/rural) are more than 300, the area is subdivided into two or more coherent units of approximately equal size less than 300. Then from within these one unit is randomly chosen for house listing. The procedure is repeated for each stratum. This yields about 5,500 households.

The entire sampling scheme is self-weighting. The selected villages and wards in urban areas (PSUs) are marked in Map 2.1 and the list is provided in Appendix B. It should be noted that the sample size was estimated for a simple random sample. Since a stratified multi-stage sampling scheme was adopted, it is very difficult to say in which direction and what magnitude the sampling error would be, as stratification reduces sampling error while cluster sampling increases the sampling error.



Map 2.1 Tamil Nadu Map Showing the Locations of Selected PSUs

All ever-married women in the age group of 13-55 years in the sample households are to be contacted with woman's questionnaire. After age verification, women in the age group 15-49 are to be identified as eligible women and interviewed to collect detailed information with the woman's questionnaire. Thus, all ever-married women of age above 15 but below 50 in the sample households formed the sample.

For selected indicators relevant to the study, sampling error is computed and provided in Appendix C.

2.3 Tools for Data Collection

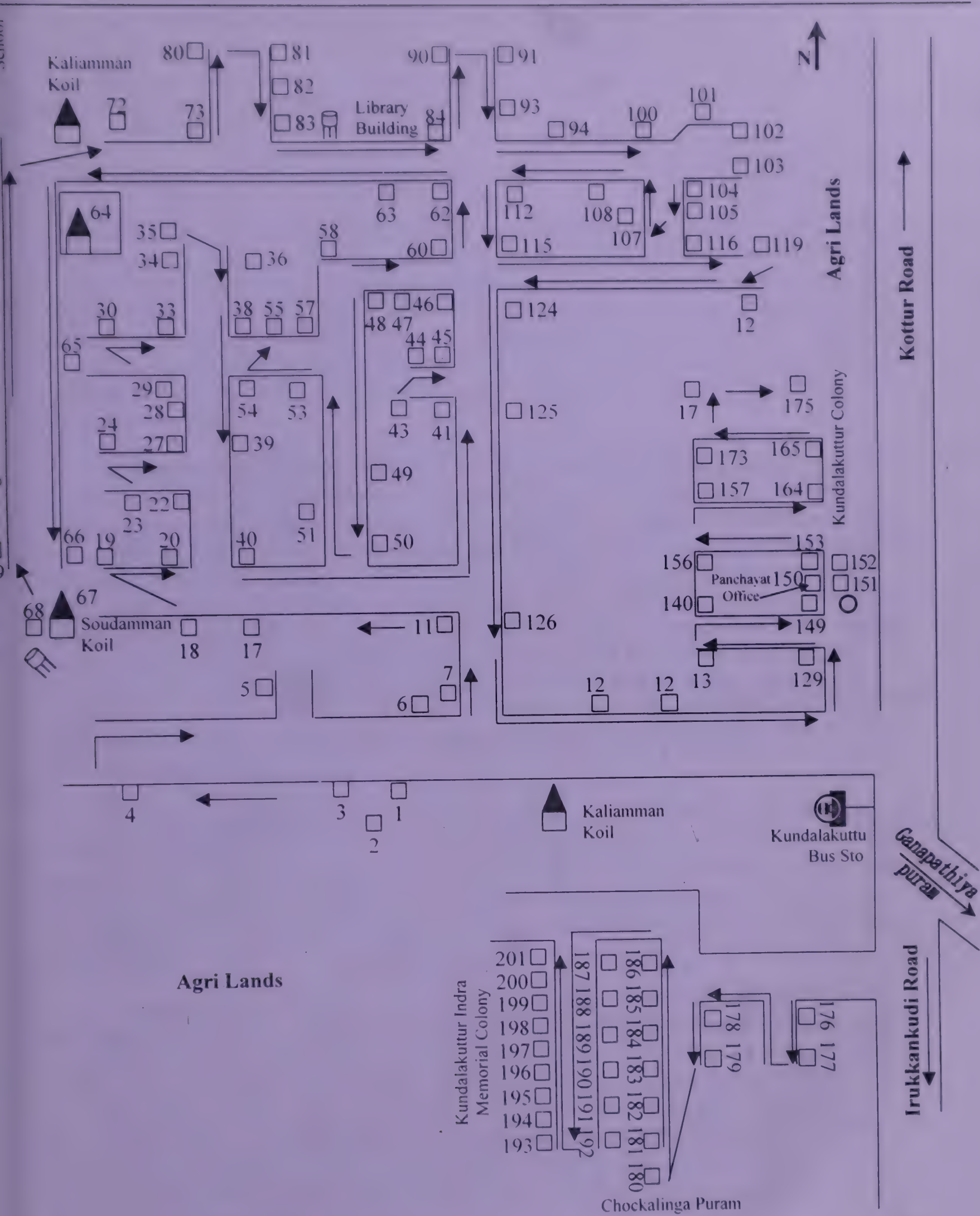
There are essentially four different tools used for data collection in this study. They are community/area profile recorder, house listing proforma, household questionnaire and woman's questionnaire.

The area profile recorder is intended for collecting information on the social and economic characteristics of the village (area) and major events – historic or routine that have occurred in the area. These are sought to explore whether the village level developmental variables explain the incidence of abortion, care-seeking behaviour, cost of service, and the type of provider. Historical and annual local events that take place in the area serve as landmarks to facilitate respondents to locate the time of their life events with greater accuracy.

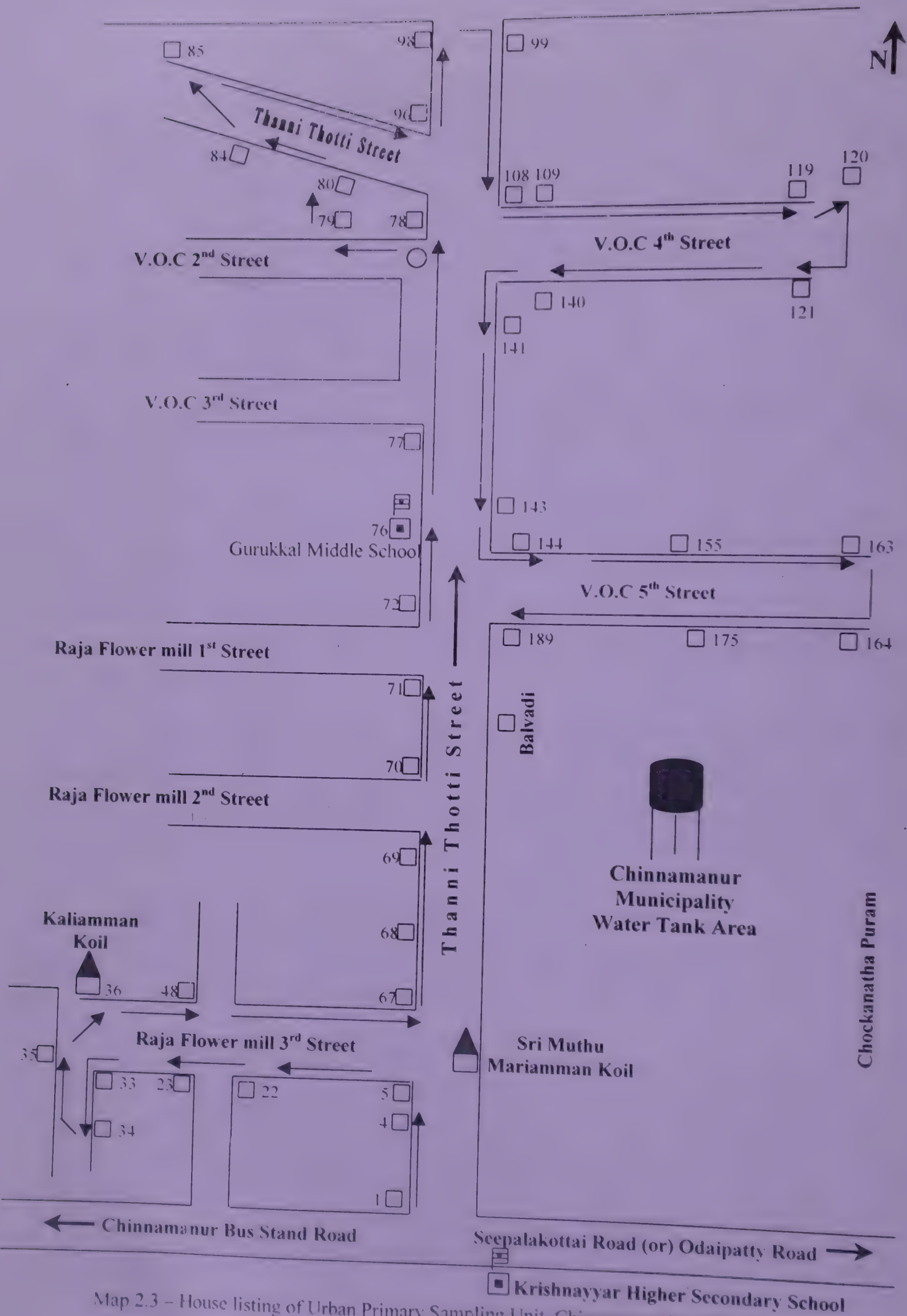
The house list proforma is used for listing the households in the selected primary sampling units. The households in a PSU are listed along with basic information on location and the name of head of household. This, in addition to serving as the sampling frame at the lowest level, helps the interviewers to identify the sample households after sample selection. Maps of one rural and one urban PSU are given in Maps 2.2 and 2.3.

The purpose of household questionnaire is to elicit basic health, demographic and socio-economic data relating to household and individuals in the household and to identify eligible women for individual interview. These data largely serve as explanatory variables – independent and/or intermediate.

The purpose of administering woman's questionnaire is to collect data on demographic and socio-economic characteristics of woman, incidence of induced and spontaneous abortions, abortion related morbidity, reasons for induced abortion, and obstetric history. There is provision in the schedule for probe in case of long pregnancy intervals for effective enumeration of all pregnancies. Data on provider of abortion services, post abortion care, complications, cost of service, household care and so on are also collected through this questionnaire. As recall lapse is likely to be more as we go too far back in time, detailed data are gathered only for those events that occurred since 1997.



Map 2.2 – House listing of Rural Primary Sampling Unit, Kundalakuttur



Map 2.3 - House listing of Urban Primary Sampling Unit, Chinnamanur Ward 17

The funding agency had already planned for a similar study in Maharashtra. The study team in Maharashtra developed the household and woman's questionnaires. In order to make the results of the studies comparable, it was felt to keep the same set of questionnaires. They were translated into Tamil (the regional language). The questionnaires were field tested and finalized.

2.4 Recruitment of Staff and Training

One research associate and a part-time secretary were recruited on 1st July, 2002 and two research assistants were recruited on 1st August, 2002. Five field supervisors and twenty field investigators (15 females and 5 males) were appointed in the second week of October 2002. The female field investigators were to administer the household and woman's schedule, the supervisors were responsible for the scrutiny of filled in questionnaires and filled in area profile proforma. Five male field investigators were also recruited to map the PSUs, house list and make arrangements for accommodation for fellow investigators.

After finalizing the house listing proforma, household questionnaire and woman's questionnaire, training programme for supervisors and field investigators and project execution monitoring plan were chalked out. As soon as the research assistants joined the team, they were briefed about the project and their roles and responsibilities. Sample PSUs were identified. Contacts with key personnel in government at the state and district levels were made. The Director of Health and Family Welfare at Chennai, District Collectors, Deputy Directors of Health and Family Planning at the district level were contacted for their support. A letter of appreciation from the Director of Health & Family Welfare, a copy of which marked to all District Health and Family Welfare offices with a request to extend cooperation was very helpful during the fieldwork. Panchayat presidents and urban ward councilors in whose area the PSUs fell were also contacted to elicit their cooperation.

All the supervisors and field investigators appointed in the project have experience in demographic and health data collection work in similar projects like National Family Health Surveys and Reproductive and Child Health Survey. Hence, the overall training need was less. However, there were areas where reorientation was required as the project is on a more sensitive topic compared to those projects where they were exposed.

An overview of the project, importance of the study, major objectives of the study and ethical issues were explained and discussed. They were then instructed on how to approach the local leaders and other influential persons and organize a community meeting to have inroads into the community. It was made clear that participating or not was individuals choice and not because of any sort of direction or coercion from government officials or elected members of the panchayat. Specific briefing was also done on ethical issues involved in collecting data, approaching individuals and obtaining free-will consent, either in writing or orally. They were then trained on how to map the area and list the households.

The entire logistic of the data collection scheme was briefed. The concepts in household and woman's questionnaires were explained, the procedures of collecting and recording data were instructed, checks for inconsistencies were detailed, and dating of events was illustrated. A flow chart was prepared and used to guide them. This helped them to follow with greater ease the logical sequencing of skips and repeats. The field supervisors and the investigators were asked to perform mock interviews in the classroom session to clear doubts, if any. They were then taken to villages to carry out all the tasks to gain field experience in mapping and house listing, rapport establishment, conducting community meetings, seeking informed consent and administering tools of data collection. The research associate and the research assistants accompanied them to the field to guide them, edited the filled in questionnaires and gave feedback. A sociologist, an economist, a demographer, a gynecologist and a legal expert served as resource persons in the training. The training period lasted from October 11 to October 23, 2002.

2.5 Ethical Issues and Concerns

Recently there is greater concern among social scientists on ethical issues in research. Respecting and protecting the rights and dignity of the participants in social research are increasingly recognized. Research should not harm the participants and the people. It should also make a positive contribution to the welfare of the people. Participants have the right to withdraw at any stage if they want.

All possible efforts were made to ensure that even inadvertently ethical norms of social research are not violated. The interviewers did not force interviewees to provide information. Interviewers were clearly instructed not to give false promises to motivate the respondents to accept to be interviewed. Only after obtaining informed consent from the participants, interview was done. If any participant expressed their desire of knowing more about the project to the interviewer, the interviewers and supervisors patiently explained them in greater detail. Participants were informed right at the beginning that they can withdraw at any stage of interview.

The interview process did not attempt to get information about others from the participants.

If any participant found it inconvenient to be interviewed at the time of first visit, time and place of interview was fixed in consultation with the participant.

Interviews were held only in privacy. In a few cases the interviews have to be terminated because of intervention of others and continued only after ensuring privacy. At all stages, from data collection to publication of results, of the study the identity of participants was protected.

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Some participants had the apprehension that Village Health Nurse or someone else in the village has identified them to the interviewers. Their doubt has been cleared by explaining the entire research process.

Basic ethical issues of the workers in the project are also taken care of. Travel to villages and urban areas and stay in different places are hazardous. Field workers were covered for accident and hospitalization through insurance policy by the project. In the light of the fact that it was a temporary position and the duration was very short, salary component was kept reasonably good.

An institutional ethics committee was constituted to ensure that the ethical concerns are properly addressed. The committee met once before starting fieldwork and once after the completion of fieldwork. It went through the instruments used in the data collection, plans and procedures of data collection, data analysis and presentation of data and was satisfied with the adherence of ethical issues in social research in this project.

2.6 Data Collection

Date of Interview

The Pregnancy Outcome Project appointed twenty-five members in two different categories namely five field supervisors, 15 female field investigators and 5 male field investigators. Five teams were formed, each consisting of one supervisor,

one male field investigator and three female field investigators. Each team covered approximately 22 PSUs. The fieldwork was done between October 26, 2002 and March 31, 2003.

Efforts to Improve the Quality of Data

Kanitkar and Radkar (2000) estimate that only 1/3rd of the induced abortions are reported. Recall lapse, reluctance on the part of the respondents to reveal the experience of induced abortion and the possibility of ineffective methodology of reckoning induced abortions are some of the reasons for under-enumeration of induced abortions (Bleek, 1987 and Das et al., 2000). Steps to overcome problems and improve reporting of incidence of induced abortions are discussed by Barreto et al., (1992). All these were incorporated in the methodology of this study. Better rapport building, maintenance of confidentiality and detailed probing when faced with long pregnancy intervals are certainly some of the measures employed to improve the quality of data in addition to other effective measures in this study. The senior fellows of the project supervised and monitored the data collection operations. Results of field check were fed back to the interviewing teams and their supervisors so that they could improve their performance.

2.7 Field Problems

As in any field survey, foreseen and unforeseen situations arise which may affect the progress of the fieldwork. The major problems encountered during the fieldwork of this survey are discussed below. These problems, however, would not have adversely affected the quality of data.

The survey was begun during the northeast monsoon period during which the coastal area of Tamil Nadu gets substantial rain. To avoid the problem of rain intervening the work, first the PSUs in the interior Tamil Nadu were covered and slowly moved to coastal areas by the time the monsoon was over. In spite of it there were occasions when the monsoon interrupted the progress of work of some teams.

When a large number of personnel are involved, problems of diverse nature crop up. One of the male investigators right from the beginning did not cooperate with the other workers. Hence he was terminated immediately and a new person, who had training already in mapping and house listing, was appointed from the waiting list kept at the project office. As the work in the project is purely temporary, workers drop out once they get some other job of permanent nature. Appointment to those vacancies could not be made because training of new recruits in the middle of the survey would be difficult. Whenever a supervisor dropped out, one of the senior female interviewers was to act as the supervisor.

There were minor difficulties with accommodations for the survey teams encountered at few rural areas and small towns. They were sorted out with the help of Panchayat Officials.

2.8 Sample Implementation

A total of 110 PSU's were selected and in each PSU the occupant households were listed. From the list of households 50 households were selected using systematic sampling procedure. This yielded 5506 sample households. The sample results are provided in the following table (Table 2.3). A few households were absent for an extended period of time and in a few households competent respondents were not available in spite of three repeated visits made by the interviewers. Ultimately the household response rate was 99.9 percent, which is the maximum that could be expected in any field survey.

Age misstatement is very frequent and age reporting in multiple of five is common under Indian conditions. In order to guard against missing of younger women all ever-married women less than or equal to 55 years of age were first contacted and their age estimated. If the estimated age is 50 or more interview was terminated. Out of 5269 ever-married women under 55 years of age found in the sample households 378 were found to be of age 50 or more. Thus the eligible women to be interviewed for detailed information on reproduction were 4879, of which only 4814 were interviewed. About 1 percent of eligible women could not be contacted in spite of 3 visits to the residents by the interviewers. The proportion of women partly interviewed or refused was insignificant. The eligible women response rate is 98.7 percent and the overall response rate is 98.6. There is not much difference between rural and urban region in the response rate. Only the proportion of eligible women not interviewed due to absence is higher in rural areas than in urban areas. This is because women in rural areas leave home early for their work in the fields and return very late in the evening.

2.9 Limitations of the Study

There are two notable limitations. First is the size of the sample. The sample size is not large enough to provide estimate of maternal mortality due to abortion. The other is non-inclusion of never married women in the survey. The incidence of induced abortion among never married is not likely to be negligible. They were not included in the survey, as the community might not approve of interviewing never-married women on their experience of induced abortion.

Table 2.3 Results of sample implementation for households and women by place of residence

Results	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Occupied households selected	3597	100.00	1909	100.00	5506	100.00
Households completed interview (C)	3583	99.61	1904	99.74	5487	99.65
Households with no household member at home or no competent respondent at home during three visits (HP)	3	0.08	2	0.10	5	0.09
Households absent for extended period (HA)	11	0.31	3	0.16	14	0.25
Household response rate (HRR)	--	99.9	--	99.9	--	99.9
Ever-married women (aged 15-55)	3384	--	1885	--	5269	--
Women aged 50 and above after age verification	243	--	135	--	378	--
Ever-married women (aged 15-49)	3132	100.00	1747	100.00	4879	100.00
Women completed interview (EWC)	3086	98.54	1728	98.92	4814	98.67
Women not at home during three visits (EWNH)	38	1.21	12	0.68	50	1.02
Women refused (EWR)	--	--	1	.06	1	0.02
Mentally challenged (EWO)	2	0.06	--	--	2	0.04
Women partly interviewed (EWPC)	6	0.19	6	0.34	12	0.25
Eligible women response rate (EWRR)	--	98.5	--	98.9	--	98.7
Overall response rate (ORR)	--	98.4	--	98.8	--	98.6

Note: HRR = 100*C/(C+HP)
EWRR = 100*EWC/(EWC + EWNH + EWR + EWO + EWPC)
ORR = (HRR * EWRR)/100

CHAPTER 3

BACKGROUND CHARACTERISTICS OF HOUSEHOLDS

This chapter presents the demographic and socio-economic characteristics of households and certain facilities available to the households. These are given for urban and rural areas separately and combined. The purpose is to get a general understanding of the context in which the study is carried out and also to have an evaluation of the quality of data obtained by comparing with other sources.

3.1 Age, Sex and Marital Status of Household Head and Family Size

Table 3.1 provides distributions of the household heads by age, sex and marital status and average family size. The median age of the household heads is 44.4 years. Rural heads have a median age of 44.7 years and the urban heads are slightly younger. Female-headed households are 11.5 percent in rural areas and 9.9 percent in urban areas. The percent of household heads widowed, divorced or separated is 13.1 percent in rural areas and 10.6 percent in urban areas. Average family size is found to be marginally smaller in rural areas (4.12) than in urban areas (4.20). Except for the proportion of female-headed households, other results are close to those of NFHS-2. While NFHS-2 shows 16 percent of households headed by females, it is only 11.0 percent in the present study.

Table 3.1 Percent distribution of households by demographic characteristics and place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent / Median	Number	Percent / Median	Number	Percent / Median
Total	3583	100.0	1904	100.0	5487	100.0
Estimated age of household head						
15-19	1	0.0	1	0.1	2	0.0
20-24	52	1.5	23	1.2	75	1.4
25-29	286	8.0	155	8.1	441	8.0
30-34	413	11.5	258	13.6	671	12.2
35-39	569	15.9	274	14.4	843	15.4
40-44	506	14.1	299	15.7	805	14.7
45-49	481	13.4	281	14.8	762	13.9
50-54	343	9.6	179	9.4	522	9.5
55-59	260	7.3	155	8.1	415	7.6
60-64	266	7.4	118	6.2	384	7.0
65-69	192	5.4	89	4.7	281	5.1
70+	214	6.0	72	3.8	286	5.2
Median age	3583	44.7	1904	44.0	5487	44.4
Sex of the head of household						
Male	3171	88.5	1716	90.1	4887	89.1
Female	412	11.5	188	9.9	600	10.9
Marital status of household head						
Single	18	0.5	13	0.7	31	0.6
Married	3096	86.4	1688	88.7	4784	87.2
Widowed	416	11.6	173	9.1	589	10.7
Divorced	6	0.2	3	0.2	9	0.2
Separated	47	1.3	27	1.4	74	1.3
Size of household						
Average number of usual residents		4.12		4.20		4.15
Average number of visitors		0.05		0.05		0.05

3.2 Age-Sex Distribution of Household Population and Sex Ratio

Table 3.2 gives the age-sex distribution of the resident members in the sample households for rural and urban separately and for the total. The number of persons under age 20 declines with age (See also Figure 3.1). This is a clear indication of fast fertility decline during the past 20 years. This has happened both in rural and urban areas, but urban area leads the change and rural area closely follows it. In the age group 50-54 the percent of females is particularly low and in the age group 60-64 the percent of women is noticeably high. As there was instruction to include all women of reported age 55 or less for estimating age and subsequently determining the eligibility for continuation of interview, it is possible that some interviewers entered higher age for those in the age range 50-55 to reduce their workload.

Table 3.2 Percent distribution of the household population by age according to sex and place of residence

Age	Male		Female		Total		Sex Ratio
	No.	%	No.	%	No.	%	
Rural							
0	109	1.5	113	1.5	222	1.5	964
1- 4	507	6.9	511	6.9	1018	6.9	992
5- 9	682	9.2	672	9.1	1354	9.2	1015
10-14	748	10.1	681	9.2	1429	9.7	1098
15-19	743	10.1	756	10.3	1499	10.2	982
20-24	647	8.8	671	9.1	1318	8.9	964
25-29	609	8.2	662	9.0	1271	8.6	920
30-34	509	6.9	575	7.8	1084	7.3	885
35-39	565	7.6	559	7.6	1124	7.6	1010
40-44	477	6.5	457	6.2	934	6.3	1043
45-49	452	6.1	409	5.6	861	5.8	1105
50-54	321	4.3	230	3.1	551	3.7	1395
55-59	246	3.3	259	3.5	505	3.4	949
60-64	270	3.7	361	4.9	631	4.3	748
65-69	222	3.0	207	2.8	429	2.9	1072
70-74	151	2.0	148	2.0	299	2.0	1020
75-79	71	1.0	44	0.6	115	0.8	1613
80+	61	0.8	57	0.8	118	0.8	1070
Total	7390	100.0	7372	100.0	14762	100.0	1002

Urban							
0	57	1.4	58	1.5	115	1.4	982
1- 4	284	7.0	258	6.5	542	6.8	1100
5- 9	320	7.9	334	8.4	654	8.2	958
10-14	350	8.7	348	8.8	698	8.7	1005
15-19	404	10.0	404	10.2	808	10.1	1000
20-24	403	10.0	421	10.6	824	10.3	957
25-29	390	9.7	380	9.6	770	9.6	1026
30-34	337	8.3	312	7.9	649	8.1	1080
35-39	298	7.4	307	7.7	605	7.6	970
40-44	277	6.9	272	6.9	549	6.9	1018
45-49	258	6.4	252	6.4	510	6.4	1024
50-54	171	4.2	121	3.1	292	3.6	1413
55-59	148	3.7	140	3.5	288	3.6	1057
60-64	122	3.0	152	3.8	274	3.4	802
65-69	112	2.8	99	2.5	211	2.6	1131
70-74	57	1.4	49	1.2	106	1.3	1163
75-79	31	0.8	20	0.5	51	0.6	1550
80+	19	0.5	37	0.9	56	0.7	513
Total	4038	100.0	3964	100.0	8002	100.0	1018
Total							
0	166	1.5	171	1.5	337	1.5	971
1- 4	791	6.9	769	6.8	1560	6.9	1029
5- 9	1002	8.8	1006	8.9	2008	8.8	996
10-14	1098	9.6	1029	9.1	2127	9.3	1067
15-19	1147	10.0	1160	10.2	2307	10.1	989
20-24	1050	9.2	1092	9.6	2142	9.4	962
25-29	999	8.7	1042	9.2	2041	9.0	959
30-34	846	7.4	887	7.8	1733	7.6	954
35-39	863	7.6	866	7.6	1729	7.6	997
40-44	754	6.6	729	6.4	1483	6.5	1034
45-49	710	6.2	661	5.8	1371	6.0	1074
50-54	492	4.3	351	3.1	843	3.7	1402
55-59	394	3.4	399	3.5	793	3.5	987
60-64	392	3.4	513	4.5	905	4.0	764
65-69	334	2.9	306	2.7	640	2.8	1092
70-74	208	1.8	197	1.7	405	1.8	1056
75-79	102	0.9	64	0.6	166	0.7	1594
80+	80	0.7	94	0.8	174	0.8	851
Total	11428	100.0	11336	100.0	22764	100.0	1008

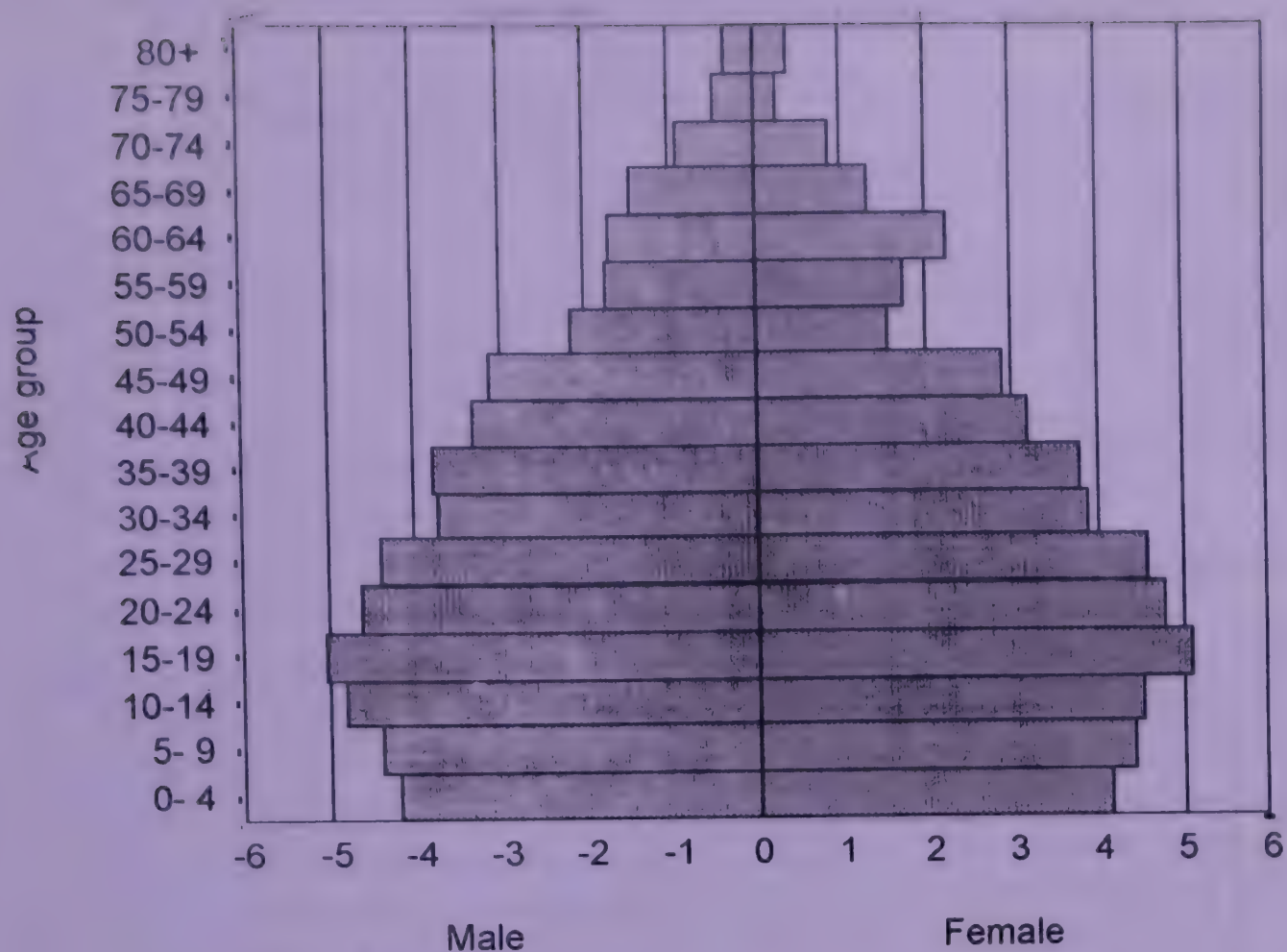


Figure 3.1 Population Pyramid

The young age dependency ratio (number of persons of age 0-14 per 100 person in the age group 15-64) is 36.1 in urban, 41.1 in rural and 39.2 rural-urban combined. The old age dependency rate (number of persons aged 65 and above per 100 persons of age 15-64) is 7.6 in urban, 9.8 in rural and 9.0 in rural-urban combine. The overall dependency rate (number of persons aged 0-14 or 65 and above to 100 persons of age 15-64) is 43.7 in urban, 50.9 in rural and 48.2 in rural-urban combine.

Following the international convention the sex ratio is presented as the number of males per 1000 females. The sex ratio of the population is 1008, 1018 in urban and 1002 in rural areas. The sex ratio in the youngest age group of 0-4 is 1018. As the sex ratio has been given for the age group 0-6 in the Census, computation made for the age group 0-6 is provided in Table 3.3 along with the estimates from Censuses and other representative surveys in Tamil Nadu. The current estimate of 1024 is very close to the estimates of other sample surveys but less than the estimate provided by the 1991 and 2001 Censuses.

Table 3.3 Sex ratio of 0-6 year old population from Censuses and representative sample surveys of Tamil Nadu

Source and year	Sex Ratio (Males / 1000 females)
Census, 1991	1055
NFHS-1, 1992	987
Ramanujam and Rajamanickam, 1995	1027
NFHS-2, 1999	1020
Census, 2001	1065
Present Study, 2003	1024

33 Marital Status of Household Population

Table 3.4 provides marital status distribution of population within age groups, sex and place of residence. The singulate mean age at marriage of girls is computed to be 21.9 years and for boys it is 27.4 years. In the age group 15-19, only 15.3 percent are evermarried women. In the age group 20-24, 60.8 percent of women and 13.2 percent of men are married at least once. As age increases the percent of women widowed, divorced and separated becomes more pronounced than the corresponding percentages for men. The major reason for this is that women marry at younger ages compared to men. The second important reason is that larger percent of widowed, divorced or separated men remarry than their counterparts. Remarriages are, thus, more frequent among men than among women. A comparison of the proportion of women never married by age between rural and urban areas indicates that the age at marriage is higher in urban areas than in rural areas.

Table 3.4 Percent distribution of household population by marital status according to age, sex and place of residence

Age	Single	Married	Widowed	Divorced	Separated	Total
Rural						
Male						
0-14	100.0	0.0	0.0	0.0	0.0	100.0
15-19	99.6	0.4	0.0	0.0	0.0	100.0
20-24	84.9	15.0	0.2	0.0	0.0	100.0
25-29	43.3	55.8	0.3	0.2	0.3	100.0
30-34	12.6	86.4	0.6	0.0	0.4	100.0
35-39	2.8	96.5	0.5	0.0	0.2	100.0
40-44	1.7	96.4	0.8	0.2	0.8	100.0
45-49	0.2	97.8	0.9	0.2	0.9	100.0
50+	0.5	88.9	9.9	0.2	0.5	100.0
Total	50.0	47.6	2.0	0.1	0.3	100.0

Female						
0-14	100.0	0.0	0.0	0.0	0.0	100.0
15-19	83.5	16.1	0.0	0.0	0.4	100.0
20-24	35.8	63.5	0.1	0.1	0.4	100.0
25-29	7.9	88.5	1.4	0.6	1.7	100.0
30-34	1.7	91.0	4.2	0.5	2.6	100.0
35-39	1.6	89.8	6.3	0.4	2.0	100.0
40-44	2.6	82.9	10.1	0.4	3.9	100.0
45-49	0.7	81.9	14.7	0.0	2.7	100.0
50+	0.8	52.4	45.4	0.2	1.2	100.0
Total	39.9	48.3	10.4	0.2	1.2	100.0
Urban						
Male						
0-14	100.0	0.0	0.0	0.0	0.0	100.0
15-19	99.8	0.2	0.0	0.0	0.0	100.0
20-24	89.8	10.2	0.0	0.0	0.0	100.0
25-29	48.7	50.8	0.0	0.3	0.3	100.0
30-34	15.4	84.0	0.3	0.0	0.3	100.0
35-39	5.4	92.6	0.7	0.3	1.0	100.0
40-44	0.7	97.8	0.0	0.4	1.1	100.0
45-49	1.9	96.1	0.4	0.4	1.2	100.0
50+	0.8	91.2	7.9	0.2	0.0	100.0
Total	50.7	47.5	1.4	0.1	0.3	100.0
Female						
0-14	100.0	0.0	0.0	0.0	0.0	100.0
15-19	87.1	12.9	0.0	0.0	0.0	100.0
20-24	44.7	54.9	0.2	0.0	0.2	100.0
25-29	11.8	85.0	1.6	0.3	1.3	100.0
30-34	2.6	91.7	2.9	0.3	2.6	100.0
35-39	1.0	92.2	3.9	0.3	2.6	100.0
40-44	1.5	83.8	12.9	0.0	1.8	100.0
45-49	0.4	79.4	17.5	0.4	2.4	100.0
50+	0.2	52.4	46.6	0.0	0.8	100.0
Total	40.4	48.6	10.0	0.1	1.0	100.0

Total						
Male						
0-14	100.0	0.0	0.0	0.0	0.0	100.0
15-19	99.7	0.3	0.0	0.0	0.0	100.0
20-24	86.8	13.1	0.1	0.0	0.0	100.0
25-29	45.4	53.9	0.2	0.2	0.3	100.0
30-34	13.7	85.5	0.5	0.0	0.4	100.0
35-39	3.7	95.1	0.6	0.1	0.5	100.0
40-44	1.3	96.9	0.5	0.3	0.9	100.0
45-49	0.8	97.2	0.7	0.3	1.0	100.0
50+	0.6	89.7	9.2	0.15	0.3	100.0
Total	50.2	47.6	1.8	0.1	0.3	100.0
Female						
0-14	100.0	0.0	0.0	0.0	0.0	100.0
15-19	84.7	15.0	0.0	0.0	0.3	100.0
20-24	39.2	60.2	0.2	0.1	0.4	100.0
25-29	9.3	87.2	1.4	0.5	1.5	100.0
30-34	2.0	91.2	3.7	0.5	2.6	100.0
35-39	1.4	90.6	5.4	0.3	2.2	100.0
40-44	2.2	83.3	11.1	0.3	3.2	100.0
45-49	0.6	80.9	15.7	0.1	2.6	100.0
50+	0.6	52.4	45.8	0.2	1.1	100.0
Total	40.1	48.4	10.3	0.2	1.1	100.0

3.4 Socio-Cultural Characteristics of Household Heads

Social characteristics of households are presented in Table 3.5. Hinduism, Islam and Christianity are the religions, which cover almost the entire population of Tamil Nadu. About 87 percent of the households follow Hinduism. There is a greater concentration of Muslims and Christians in urban areas. Scheduled caste and scheduled tribe populations contribute 21.7 percent and 1.0 percent respectively, which are closer to the estimates of NFHS-2. About 73 percent of households are nuclear and this does not differ much between rural and urban areas. As could be expected the percent of illiterates is more among rural heads (35 percent) than among urban heads (17 percent). Over all, the level of education is also higher among urban heads than the rural heads.

Table 3.5 Percent distribution of households by socio-cultural characteristics according to place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Total	3583	100.0	1904	100.0	5487	100.0
Religion						
Hindu	3320	92.7	1447	76.0	4767	86.9
Muslim	95	2.7	270	14.2	365	6.7
Christian	168	4.7	186	9.8	354	6.5
Jain	0	0.0	1	0.1	1	0.0
Caste						
Scheduled caste	859	24.0	330	17.3	1189	21.7
Scheduled tribes	53	1.5	1	0.1	54	1.0
Not stated/ Refused	34	0.9	55	2.9	89	1.6
Others	2637	73.6	1518	79.7	4155	75.7
Family type						
Nuclear	2588	72.2	1402	73.6	3990	72.7
Non-nuclear	995	27.8	502	26.4	1497	27.3
Education of the household head						
Illiterate	1264	35.3	318	16.7	1582	28.8
Literate & < primary school complete	332	9.3	145	7.6	477	8.7
Primary school complete	831	23.2	412	21.6	1243	22.7
Middle school complete	451	12.6	312	16.4	763	13.9
High school complete	322	9.0	288	15.1	610	11.1
Higher secondary complete and Above	383	10.7	429	22.5	812	14.8

3.5 Educational Level of Household Population

The data on literacy provided in Table 3.6 show an encouraging trend. The rate of illiteracy has declined in the younger cohorts. In the age group 10-14 the illiterates are only 2.5 percent and the percentage is the same both for males and females. In the urban area, the illiteracy rate for females is less than males in the same age group. Even in high school completion there is no difference between boys and girls in the age group 15-19 in urban area. In rural area, girls still marginally lag behind in high school education. However, in the older age groups the traditional large difference between sexes is seen.

Table 3.6 Percent distribution of household population age 6 and above by educational level according to age, sex and place of residence

Educational level					
Age	Illiterate	Literate but < Middle school complete	Middle school complete	High school complete & above	Total
Rural					
Male					
6-9	6.1	93.9	0.0	0.0	100.0
10-14	2.5	82.1	15.4	0.0	100.0
15-19	3.8	25.2	30.6	40.5	100.0
20-29	7.3	26.1	21.4	45.1	100.0
30-39	21.1	31.4	17.3	30.2	100.0
40-49	27.9	34.7	13.3	24.1	100.0
50 +	46.0	34.2	8.1	11.7	100.0
Total	19.2	41.6	15.5	23.7	100.0
Female					
6-9	8.7	91.3	0.0	0.0	100.0
10-14	3.5	79.7	16.7	0.0	100.0
15-19	8.7	24.9	30.3	36.1	100.0
20-29	22.7	29.6	17.9	29.7	100.0
30-39	44.6	34.4	9.6	11.4	100.0
40-49	56.8	27.3	8.2	7.7	100.0
50 +	80.1	15.0	2.1	2.8	100.0
Total	37.5	37.0	11.9	13.6	100.0
Total					
6-9	7.4	92.6	0.0	0.0	100.0
10-14	3.0	81.0	16.0	0.0	100.0
15-19	6.3	25.0	30.4	38.3	100.0
20-29	15.3	27.9	19.6	37.2	100.0
30-39	33.2	32.9	13.4	20.5	100.0
40-49	41.8	31.1	10.9	16.2	100.0
50 +	62.8	24.7	5.2	7.3	100.0
Total	28.4	39.3	13.7	18.6	100.0

Urban					
Male					
6-9	6.5	93.5	0.0	0.0	100.0
10-14	2.6	78.0	19.4	0.0	100.0
15-19	2.2	21.8	27.0	49.0	100.0
20-29	4.7	22.8	18.4	54.1	100.0
30-39	9.0	28.0	17.3	45.7	100.0
40-49	10.5	29.5	18.7	41.3	100.0
50 +	22.4	27.1	14.7	35.8	100.0
Total	9.2	35.8	17.3	37.8	100.0
Female					
6-9	3.7	96.3	0.0	0.0	100.0
10-14	0.6	73.6	25.9	0.0	100.0
15-19	4.2	17.8	28.2	49.8	100.0
20-29	10.0	27.3	16.7	45.9	100.0
30-39	20.5	38.1	15.2	26.2	100.0
40-49	28.2	37.2	13.2	21.4	100.0
50 +	53.2	26.7	9.5	10.5	100.0
Total	19.9	39.1	15.6	25.4	100.0
Total					
6-9	5.1	94.9	0.0	0.0	100.0
10-14	1.6	75.8	22.6	0.0	100.0
15-19	3.2	19.8	27.6	49.4	100.0
20-29	7.3	25.1	17.6	50.0	100.0
30-39	14.7	33.0	16.3	36.0	100.0
40-49	19.3	33.3	16.0	31.4	100.0
50 +	37.3	26.9	12.2	23.6	100.0
Total	14.5	37.4	16.5	31.6	100.0

Total					
Male					
6-9	6.2	93.8	0.0	0.0	100.0
10-14	2.6	80.8	16.7	0.0	100.0
15-19	3.2	24.0	29.3	43.5	100.0
20-29	6.3	24.8	20.3	48.6	100.0
30-39	16.6	30.1	17.3	35.9	100.0
40-49	21.5	32.8	15.3	30.4	100.0
50 +	38.2	31.9	10.3	19.6	100.0
Total	15.6	39.5	16.2	28.7	100.0
Female					
6-9	7.1	92.9	0.0	0.0	100.0
10-14	2.5	77.6	19.8	0.0	100.0
15-19	7.2	22.4	29.6	40.9	100.0
20-29	17.9	28.8	17.5	35.8	100.0
30-39	36.1	35.7	11.6	16.6	100.0
40-49	46.0	31.0	10.1	12.9	100.0
50 +	71.5	18.8	4.5	5.2	100.0
Total	31.3	37.7	13.2	17.7	100.0
Total					
6-9	6.7	93.3	0.0	0.0	100.0
10-14	2.5	79.3	18.2	0.0	100.0
15-19	5.2	23.2	29.4	42.2	100.0
20-29	12.2	26.8	18.8	42.1	100.0
30-39	26.5	33.0	14.4	26.1	100.0
40-49	33.5	31.9	12.8	21.9	100.0
50 +	54.5	25.5	7.5	12.6	100.0
Total	23.5	38.6	14.7	23.2	100.0

3.6 Economic and Housing Characteristics of Households

Economic characteristics of the sample households are given in Table 3.7. Owner cultivation and agricultural labour are vocations for about 50 percent of the rural heads. Percentages of household heads in business or trade, professional or clerical occupations, skilled or industrial work are higher in urban than in rural areas. There is a great divide in the annual income of households. While average annual income of urban household is Rs. 53,579 (median Rs.36,000), it is only Rs. 35, 585 (median Rs. 24,000) in rural area. Per capita annual income is Rs. 8,637 in rural area and Rs. 12,757 in urban area. In rural area about 90 percent of households live in own houses. But in urban area only 56 percent of households live in own houses. The rest of households in urban area live in rented houses owned by others or by institutions including governments. Further the average number of rooms available to households is 2.4 in rural area and 2.6 in urban area. Judging by the materials used for roofs, walls and floor, it is obvious that the quality of housing is poor in rural area. Ownership of land and livestock is much higher in rural area. This does not, however, mean that rural households are richer. For rural households they are the sources of income whereas in urban area non-agricultural jobs are the major source of income.

Data on ownership of consumer goods are also provided in the table. Ownership of all consumer goods show that urban households are better off than rural households. For example, 48 percent and 37 percent have pressure cooker and colour television respectively in urban area and they are only 19 percent and 17 percent in rural area. Types of vessels used also indicate the poor status of rural households. Households using mud vessels are 15 percent and 3 percent in rural and urban areas respectively.

Using the information available on consumer goods owned by the household and other amenities present in the house, a composite index is constructed following the procedure adopted in the NFHS-2. The method followed in this study is described in the Appendix D. Based on the score on the index the households are classified into those having a low, medium and high standards. It is evident from the table that rural households on the average enjoy a poor standard than the urban households. In the rural area 43 percent of households lead a low standard of living and in urban area the corresponding percentage is 20. Even though the procedure of construction and categorization are almost the same as those used in NFHS-2, the proportion of households in the three categories varied substantially between NFHS-2 time (1999) and the present study time (2003). The percent of households in high standard is 14 in NFHS-2 and 31 in the present study. Standard of life could not have changed so drastically between 1999 and 2003. This artifact is likely because of the scoring given to various goods owned. During the period 1999-2003, the percent of ownership of chair, cot/bed, clock/watch, electric fan, telephone, television and moped/ motor cycle/ scooter increased substantially. Based on these we can judge that the standard of life has increased to certain extent. But sum of scores increases so much that a large percent of households are classified to be enjoying high standard of living in 2003. Further the scoring procedure is very arbitrary. Hence yet another index, called asset index, is computed.

The data used and the method adopted in the construction of this index is described in Appendix E. Based on the index score households are classified into low, medium and high. This index also shows that rural households are generally lower in asset holding compared to urban households. According to this index while 23 percent of rural households are classified as high, the percent among urban households is 53.

Table 3.7 Percent distribution of households by economic characteristics according to place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent / Mean	Number	Percent / Mean	Number	Percent / Mean
Total	3583	100.0	1904	100.0	5487	100.0
Occupation of the household head						
Owner cultivator	512	14.3	25	1.3	537	9.8
Labourers(Agri)	1247	34.8	140	7.4	1387	25.3
Fishing	50	1.4	37	1.9	87	1.6
Labourers (Non-Agri)	330	9.2	353	18.5	683	12.4
Business & trade	291	8.1	338	17.8	629	11.5
Professional & clerical	241	6.7	250	13.1	491	8.9
Professional service	18	0.5	17	0.9	35	0.6
Industrial / Skilled worker	197	5.5	171	9.0	368	6.7
Sales worker	14	0.4	27	1.4	41	0.7
Traditional artisans	156	4.4	155	8.1	311	5.7
Transport workers	110	3.1	99	5.2	209	3.8
Others	32	0.9	53	2.8	85	1.55
Unemployed	385	10.7	239	12.6	624	11.4
Average annual household income (Rs)						
	35585		53579		41829	
Median annual household income (Rs)						
	24000		36000		28000	
Ownership of house (Percent)						
	89.1		56.5		77.7	
Other houses owned (Percent)						
	8.3		12.1		9.6	
Average number of rooms available including kitchen for the family						
	2.4		2.6		2.5	

Characteristics	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Total	3583	100.0	1904	100.0	5487	100.0
Roof material						
Thatch / cloth / gunny bags / leaves	1087	30.3	288	15.1	1375	25.1
Asbestos / tin sheets /tiles	1556	43.4	666	35.0	2222	40.5
RC/Cement/slab	940	26.2	950	49.9	1890	34.4
Wall material						
Thatch / cloth / gunny bags / leaves	70	2.0	16	0.8	86	1.6
Stone slab / tin sheets	43	1.2	13	0.7	56	1.0
Bricks / cement / mud	3467	96.8	1875	98.5	5342	97.4
Wood	3	0.1	0	0.0	3	0.1
Floor material						
Mud	1062	29.6	127	6.7	1189	21.7
Cement	2375	66.3	1600	84.0	3975	72.4
Stone slab	37	1.0	41	2.2	78	1.4
Tiles / marble / mosaic	109	3.0	136	7.1	245	4.5
Ownership of agricultural land						
Owned by family	1144	31.9	93	4.9	1237	22.5
Jointly owned	130	3.6	35	1.8	165	3.0
No owned land	2309	64.4	1776	93.3	4085	74.4
Ownership of live stock (Percent)						
		29.3		2.9		20.2
Other assets (Percent)						
Own mattress		0.4		0.6		0.5
Pressure cooker		19.1		48.1		29.2
Chair		50.3		73.8		58.4
Cot / bed		55.9		67.2		59.8
Table		30.8		51.4		37.9
Clock / watch		78.6		92.5		83.4
Electric fan		55.1		82.7		64.7
Bicycle		48.4		55.4		50.8
Radio / transistor		35.4		44.4		38.5
Sewing machine		7.0		16.5		10.3
Telephone		11.5		21.8		15.1
Refrigerator		4.9		14.6		8.3
TV (Black & White)		26.4		38.4		30.5
TV (Colour)		16.6		36.8		23.6
Moped/ Motorcycles /Scooter		15.2		23.5		18.0
Car		0.7		2.0		1.2
Water pump		7.1		3.6		5.9
Bullock cart		1.6		0.2		1.1
Tractor		1.3		0.2		0.9

Type of vessel used (Percent)						
Mud		14.6		2.6		10.4
Aluminum		97.2		98.5		97.7
Cast iron		4.6		7.8		5.7
Copper		2.5		3.1		2.7
Stainless steel		94.1		98.3		95.6
Glass		0.9		1.6		1.2
Brass		1.7		9.1		4.3
Plastic		29.7		24.8		28.0
China clay		0.0		0.2		0.1
Standard of living index						
Low	1527	42.6	378	19.9	1905	34.7
Medium	1179	32.9	690	36.2	1869	34.1
High	877	24.5	836	43.9	1713	31.2
Asset index						
Low	1559	43.5	275	14.4	1834	33.4
Medium	1212	33.8	612	32.1	1824	33.2
High	812	22.7	1017	53.4	1829	33.3

3.7 Access to Basic Amenities

Table 3.8 provides information on basic amenities available in the household. There does not seem to be much difference in the drinking water sources between urban and rural areas. The only difference is that the dependence on well or bore well/hand pump is marginally higher in rural areas than in urban areas. Generally, dependence on open source like river/pond/lake is very less. As regards electrification for lighting 95 percent of urban households and 83 percent of rural households have the facility. There is, however, a vast difference between rural and urban households in the fuel used for cooking. Dependence on firewood is very high in rural area (70 percent), while about one-fourth of the households in urban area depend on it as major source. One-half of households in urban area use LPG, but only 20 percent of rural households use it.

Bathroom inside the house is available in 55 percent of urban and 19 percent of rural households. There is no separate room for bathing in 41 percent of rural and 13 percent of urban households.

Even today 80 percent of rural households and 25 percent of urban households have no toilet facility and use open space. Eleven percent of urban households and one percent of rural households utilize public toilet facility. Flush toilet facility is owned by 63 percent of urban and 19 percent of rural households.

Table 3.8 Percent distribution of households by access to basic amenities according to place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Drinking water source						
Tap	2868	80.0	1598	83.9	4466	81.4
Bore well / hand pump	510	14.2	230	12.1	740	13.5
Well	171	4.8	30	1.6	201	3.7
Truck	5	0.1	38	2.0	43	0.8
River / pond / lake	17	0.5	3	0.2	20	0.4
Tap / well	4	0.1	2	0.1	6	0.1
Tap / bore well / hand pump	4	0.1	2	0.1	6	0.1
Tap / river / pond / lake	2	0.1	0	0.0	2	0.0
Well / bore well/ hand pump	2	0.1	0	0.0	2	0.0
Truck/well	0	0.0	1	0.1	1	0.0
Availability of electricity						
	3583	83.1	1904	95.0	5487	87.2
Fuel used for cooking (major source)						
Fire wood	2504	69.9	487	25.6	2991	54.5
LPG	716	20.0	964	50.6	1680	30.6
Kerosene	202	5.6	426	22.4	628	11.4
Sticks	140	3.9	21	1.1	161	2.9
Bio-gas	15	0.4	1	0.1	16	0.3
Cow-dung cakes	1	0.0	0	0.0	1	0.0
Coal	0	0.0	1	0.1	1	0.0
Charcoal	3	0.1	0	0.0	3	0.1
Wood dust	2	0.1	4	0.2	6	0.1
Separate room for bathing						
No separate room	1458	40.7	238	12.5	1696	30.9
Yes, outside the house	1436	40.1	626	32.9	2062	37.6
Yes, inside the house	689	19.2	1040	54.6	1729	31.5
Type of toilet						
No toilet – use open space	2854	79.7	478	25.1	3332	60.7
Public toilet	35	1.0	210	11.0	245	4.5
Pit toilet	22	0.6	13	0.7	35	0.6
Own flush toilet	672	18.8	1203	63.2	1875	34.2

3.8 General Sickness and Choice of Service Provider

To have a broader understanding of the source of medical consultation to the families, questions were put to the household respondent about the source of medical consultation if someone in the family falls sick. About 53 percent of rural families seek government sources whereas 55 percent of urban families seek private service (Table 3.9). Among those seeking government sources 59 percent prefer it for the free service (Table 3.10). Major reason for preferring private services is 'good service'. In order to be more specific whether any one in the family has been sick during one month preceding the date of survey is inquired. Around 32 percent of rural as well as urban households reported that someone in the family was sick (Table 3.11). Fever, cold, cough and headache are the frequently reported illnesses. Half of those who experienced some illness had one or more of these. Pain in the body or limbs is the next in the order of frequency followed by problems of the digestive system (stomach pain, dysentery and vomiting). Type of medical consultation for these specific illnesses also reveals a pattern closer to the one reported earlier (Table 3.12). Rural families depend on government and private sources almost equally, whereas urban families depend on private service more than government service. About 70 percent of those seeking private service do so for their good service compared to 45 percent among those seeking government service (Table 3.13).

Table 3.9 Medical consultation for sickness of household members according to place of residence

Type of medical consultation	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Government service	1904	53.1	804	42.2	2708	49.4
Private service	1626	45.4	1045	54.9	2671	48.7
Home remedies	15	0.4	47	2.5	62	1.1
Local untrained	11	0.3	4	0.2	15	0.3
Homeopathy	12	0.3	0	0.0	12	0.2
NGOs	11	0.3	0	0.0	11	0.2
Pharmacists	4	0.1	4	0.2	8	0.1

Table 3.10 Reason for choice of service provider for sickness of household members

Reason for choice	Govt. Service		Private Service		Others		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	2708	100.0	2671	100.0	108	100.0	5487	100.0
Good service	809	29.9	1959	73.3	41	38.0	2809	51.2
Free or concessionary	1596	58.9	93	3.5	43	39.8	1732	31.6
Nearness or easy transport	240	8.9	281	10.5	11	10.2	532	9.7
Family doctor	16	0.6	256	9.6	2	1.9	274	5.0
Specialist	4	0.1	29	1.1	0	0.0	33	0.6
Cleanliness	1	0.0	11	0.4	0	0.0	12	0.3
Less crowded	5	0.2	12	0.4	0	0.0	17	0.3
Time constraint	0	0.0	6	0.2	0	0.0	6	0.1
Others	33	1.2	19	0.7	5	4.6	57	1.0
No response	4	0.1	5	0.2	6	5.6	15	0.3

Table 3.11 Type of illness experienced by household members during one month preceding survey by place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Total	3583	100.0	1904	100.0	5487	100.0
Any one sick in the house						
Yes	1118	31.2	625	32.8	1743	31.8
No	2465	68.8	1279	67.2	3744	68.2
Type of illness						
No illness	2465	68.8	1279	67.2	3744	68.2
Fever	290	8.1	184	9.7	474	8.6
Cold, cough & headache	111	3.1	68	3.6	179	3.3
Fever, cold, cough & headache	170	4.7	93	4.9	263	4.8
Pain in hand and leg	80	2.2	45	2.4	125	2.3
Stomach pain	47	1.3	28	1.5	75	1.4
Chest pain or heart problem	40	1.1	18	0.9	58	1.1
Boils in hand & leg	25	0.7	13	0.7	38	0.7
Breathing problem	28	0.8	13	0.7	41	0.7
Body pain	36	1.0	13	0.7	49	0.9
Blood pressure	21	0.6	15	0.8	36	0.7
Dysentery and vomiting	34	0.9	11	0.6	45	0.8
ENT	22	0.6	12	0.6	34	0.6
Wound	21	0.6	7	0.4	28	0.5
Diabetes	21	0.6	14	0.7	35	0.6
Digestive system disorder	24	0.7	3	0.2	27	0.5
Swelling in joints and pain	16	0.4	12	0.6	28	0.5
Dog bite	5	0.1	2	0.1	7	0.1
Skin related	17	0.5	7	0.4	24	0.4
Fracture or injury	8	0.2	7	0.4	15	0.3
Snake bite	13	0.4	1	0.1	14	0.3
Dental	11	0.3	8	0.4	19	0.3
Neurological	18	0.5	7	0.4	25	0.5
Tuberculosis	9	0.3	4	0.2	13	0.2
Anemia	1	0.0	3	0.2	4	0.1
Giddiness	3	0.1	4	0.2	7	0.1
Antenatal problems	7	0.2	4	0.2	11	0.2
Urinary tract problems	4	0.1	8	0.4	12	0.2
Gynecological problems	12	0.3	6	0.3	18	0.3
Eye	11	0.3	4	0.2	15	0.3
Others	13	0.4	11	0.6	24	0.4



Table 3.12 Medical consultation for sickness suffered during one month preceding the survey by place of residence

Characteristics	Rural		Urban		Total	
	No.	%	No.	%	No.	%
Total	3583	100.0	1904	100.0	5487	100.0
Type of medical consultation						
No illness	2446	68.3	1263	66.3	3709	67.6
Private service	558	15.6	368	19.3	926	16.9
Govt. service	553	15.4	244	12.8	797	14.5
Pharmacists	17	0.5	11	0.6	28	0.5
NGOs	3	0.1	10	0.5	13	0.2
Local untrained	5	0.1	6	0.3	11	0.2
Homeopathy	1	0.0	1	0.1	2	0.0
Siddha	0	0.0	1	0.1	1	0.0

Table 3.13 Reason for choice of service provider for sickness suffered during one month preceding the survey

Characteristics	Govt. Service		Private Service		Others		Total	
	No.	%	No.	%	No.	%	No.	%
Total	797	100.0	926	100.0	55	100.0	1778	100.0
Good service	357	44.8	645	69.6	32	58.2	1034	58.2
Cleanliness	313	39.3	9	1.0	4	7.3	326	18.3
Family doctor	8	1.0	149	16.1	3	5.5	160	8.9
Nearness or easy transport	26	3.3	62	6.7	3	5.5	91	5.1
Free or concession	63	7.9	5	0.5	0	0.0	68	3.8
Specialist	19	2.4	36	3.9	4	7.3	59	3.3
Less crowded	1	0.1	7	0.8	0	0.0	8	0.4
Time constraint	1	0.1	0	0.0	2	3.6	3	0.2
Others	9	1.1	13	1.4	7	12.7	29	1.6

CHAPTER 4

BACKGROUND CHARACTERISTICS OF WOMEN

This chapter presents the demographic and socio-economic profile of ever-married women of age 15-49 and for whom the interview was completed. In all the following analysis only these women are taken into consideration. The total number of such women is 4814.

4.1 Age and Marital Status of Ever-Married Women

Table 4.1 presents the percent distribution of women by age. The percent of women in five-year age groups increases from 3.7 in the age group 15-19 to 19.5 in the age group 25-29 years, and then falls steadily to 13.0 percent in the age group 45-49 years. The age distribution of women is almost similar in rural and urban areas and the mean age is 33.2 in rural and 33.8 in urban areas. The small difference in the mean age between rural and urban areas is due to relatively higher age at marriage of girls in urban areas. Ninety two percent of the women are currently married, 6 percent are widowed and the remaining 2.4 percent are either divorced or separated (Table 4.2). The distribution does not differ between rural and urban areas. The results are close to those of NFHS-2, Tamil Nadu (2001). The proportion widowed increases by age of women and reaches 16 percent among ever-married women in the age range 45-49. Another 2.7 percent of them are either divorced or separated. The pattern is the same in rural and urban areas, except that women in urban areas marry late as observed earlier and 17.2 widowed in the age 45-49 is marginally higher in urban areas.

4.2 Socio-Cultural Characteristics of Ever-Married Women

Table 4.3 presents the social characteristics. Eighty six percent of the women in this study are Hindus, 8 percent are Muslims and 6 percent are Christians. There is a concentration of Muslims and Christians in urban areas. Scheduled caste and Scheduled tribe women constitute 22.0 percent and 1.1 percent respectively. Disproportionately larger percentages of women from Scheduled castes and Scheduled tribes are found in rural than in urban area. About 65 percent of women are in nuclear families. There is no significant difference in this between rural and urban areas.

Table 4.1 Percent distribution of ever-married women in the age 15-49 according to place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Total	3086	100.0	1728	100.0	4814	100.0
Estimated age of women						
15-19	127	4.1	52	3.0	179	3.7
20-24	423	13.7	225	13.0	648	13.5
25-29	605	19.6	334	19.3	939	19.5
30-34	558	18.1	305	17.7	863	17.9
35-39	536	17.4	297	17.2	833	17.3
40-44	448	14.5	271	15.7	719	14.9
45-49	389	12.6	244	14.1	633	13.1
Mean age	33.2		33.8		33.4	
Marital status of women						
Currently Married	2832	91.8	1586	91.8	4418	91.8
Widowed	173	5.6	105	6.1	278	5.8
Divorced	11	0.4	4	0.2	15	0.3
Separated	70	2.3	33	1.9	103	2.1

Table 4.2 Percent distribution of ever-married women by marital status according to age and place of residence

Age	Currently married	Widowed	Divorced	Separated	Total
Rural					
15-19	96.9	0.0	0.0	3.1	100.0
20-24	99.1	0.2	0.2	0.5	100.0
25-29	96.2	1.3	0.7	1.8	100.0
30-34	92.5	4.5	0.4	2.7	100.0
35-39	91.4	6.2	0.4	2.1	100.0
40-44	85.0	10.7	0.4	3.8	100.0
45-49	82.5	14.9	0.0	2.6	100.0
Urban					
15-19	100.0	0.0	0.0	0.0	100.0
20-24	99.1	0.4	0.0	0.4	100.0
25-29	96.4	1.8	0.3	1.5	100.0
30-34	94.1	3.0	0.3	2.6	100.0
35-39	92.9	4.0	0.3	2.7	100.0
40-44	85.2	12.9	0.0	1.8	100.0
45-49	79.9	17.2	0.4	2.5	100.0
Total					
15-19	97.8	0.0	0.0	2.2	100.0
20-24	99.1	0.3	0.1	0.5	100.0
25-29	96.3	1.5	0.5	1.7	100.0
30-34	93.0	3.9	0.4	2.7	100.0
35-39	92.0	5.4	0.4	2.3	100.0
40-44	85.1	11.5	0.3	3.1	100.0
45-49	81.5	15.8	0.2	2.5	100.0

Table 4.3 Socio-cultural characteristics of ever-married women according to place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Total	3086	100.0	1728	100.0	4814	100.0
Religion						
Hindu	2861	92.7	1295	74.9	4156	86.3
Muslim	100	3.2	276	16.0	376	7.8
Christian	125	4.1	157	9.1	282	5.9
Caste						
Scheduled castes	755	24.5	308	17.8	1063	22.1
Scheduled tribes	52	1.7	1	0.1	53	1.1
Not stated / Refused	24	0.8	51	3.0	75	1.6
Others	2255	73.1	1368	79.2	3623	75.3
Family type						
Nuclear	1998	64.7	1140	66.0	3138	65.2
Non-nuclear	1088	35.3	588	34.0	1676	34.8

4.3 Educational Level of Ever-Married Women

The table 4.4 presents the distribution of women by educational level. The percent of literates in the urban area is 80 percent, in the rural area is 60 percent and it is 67 percent when both are combined. A perusal of the educational level of women in different age groups indicates that the level of illiteracy declines with age, from 47 percent at 45-49 years of age to 15 percent at age 15-19 years. The decline in illiteracy observed among all women in the previous chapter is higher than the one observed here. This is because of young age at marriage for less educated women. The pattern is similar in urban and rural areas.

Table 4.4 Percentage distribution of ever-married women by level of education according to age and place of residence

Age	Education of Women				Total
	Illiterate	Literate & Primary complete	Middle school complete	High School & above	
Rural					
15-19	19.7	36.2	26.8	17.3	100.0
20-24	19.9	31.4	25.1	23.6	100.0
25-29	31.4	31.4	13.1	24.1	100.0
30-34	43.5	34.2	9.3	12.9	100.0
35-39	44.4	36.0	9.7	9.9	100.0
40-44	57.8	26.8	8.0	7.4	100.0
45-49	55.3	29.0	8.2	7.5	100.0
All	40.6	32.0	12.7	14.7	100.0
Urban					
15-19	3.8	36.5	30.8	28.8	100.0
20-24	10.2	35.1	19.6	35.1	100.0
25-29	13.2	30.5	18.6	37.7	100.0
30-34	18.4	41.3	12.5	27.9	100.0
35-39	22.2	36.7	18.5	22.6	100.0
40-44	23.6	39.1	15.9	21.4	100.0
45-49	33.6	35.7	9.4	21.3	100.0
All	19.5	36.3	16.3	27.9	100.0
Total					
15-19	15.1	36.3	27.9	20.7	100.0
20-24	16.5	32.7	23.1	27.6	100.0
25-29	24.9	31.1	15.0	29.0	100.0
30-34	34.6	36.7	10.4	18.2	100.0
35-39	36.5	36.3	12.8	14.4	100.0
40-44	44.9	31.4	11.0	12.7	100.0
45-49	46.9	31.6	8.7	12.8	100.0
All	33.0	33.5	14.0	19.5	100.0

4.1 Economic Characteristics of Ever-Married Women

Economic characteristics of women are given in Table 4.5. About two-thirds of women (65 percent) in urban area do not work for wage/salary. In rural area this percent is only 37. As could be expected, a larger segment of urban women work in professional and clerical occupations (5.0 percent) than women in rural area (2.4 percent). Owner cultivators and agricultural labourers together constitute larger percentage (46.3) among rural women than among urban women (7.2 percent), while the converse is true with non-agricultural labourers. The standard of living index shows that urban women enjoy higher standards than rural women. About 40 percent of rural women have a low standard of living, while this percentage is only 17 among urban women. The percent of women classified under high standard of living is 46.6 percent among urban women and 27 percent among rural women. Asset Index also reflects the same findings and thus support the fact that standard of life in rural area is lower than in the urban area.

Table 4.5 Percent distribution of ever-married women age 15-49 by economic characteristics according to place of residence

Characteristics	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Total	3086	100.0	1728	100.0	4814	100.0
Occupation of women						
Owner cultivator	497	16.1	24	1.4	521	10.8
Labourers (Agri)	934	30.3	101	5.8	1035	21.5
Labourers (Non-Agri)	190	6.2	220	12.7	410	8.5
Business & trade	75	2.4	58	3.4	133	2.8
Employed professional	75	2.4	87	5.0	162	3.4
Industrial worker	42	1.4	7	0.4	49	1.0
Modern skilled services	113	3.7	62	3.6	175	3.6
Others	11	0.4	44	2.5	55	1.1
Not working outside home	1149	37.2	1125	65.1	2274	47.2
Standard of living index						
Low	1199	38.9	300	17.4	1499	31.1
Medium	1065	34.5	623	36.6	1688	35.1
High	822	26.6	805	46.6	1627	33.8
Asset index						
Low	1225	39.7	216	12.5	1441	30.0
Medium	1094	35.6	542	31.4	1636	34.0
High	767	24.9	970	56.1	1737	36.1

CHAPTER 5

FERTILITY AND INFANT MORTALITY

This section is devoted to the discussion of fertility and infant mortality. The fertility measures were calculated based on the data collected on the birth history of ever-married women 15-49 years. Computation of crude birth rate (CBR) and age-specific fertility rates (ASFR) based on births occurred in one year period is likely to be affected by sampling error, but at the same time depending on the number of births occurred in a long period of time is likely to be seriously affected by recall lapse. Hence striking a balance, births occurred during three years preceding survey date is taken for computing crude birth rate and age-specific fertility rates. To obtain the denominator for computing the crude birth rate, the total population count from the survey is back projected for one-and-a-half years assuming arithmetic rate of increase in the population. This assumption is closer to the truth since between 1981-91 and 1991-2001 the rate of growth in the Tamil Nadu census count has declined and the population counts in 1981, 1991 and 2001 followed a straight line. For the computation of the age-specific fertility rates, the denominator is obtained by adding the person years lived by the sample women during the three years preceding the survey in corresponding age groups. The Total Fertility Rate (TFR) is obtained by adding the ASFRs and multiplying the sum by five.

5.1 Current Fertility Levels

In Table 5.1 CBR and ASFRs obtained from the present survey are provided along with the rates obtained from other sources for Tamil Nadu during the recent period. The crude birth rate of 18.2 for the period 2000-2002 obtained from the present survey fits well with the trend in the CBR in the recent past. The TFR is estimated to be 1.94 and this is below replacement level of about 2.1. Even though the fertility is very low and is below replacement level, the age pattern of fertility shows early peak (Figure 5.1). In the age group 20-24, where the fertility peaks, 45 percent of the total reproduction takes place. The fertility in 15-19 age group accounts for 14 percent of total fertility. Three-fourths of total fertility is concentrated in the age bracket 20-29. Reproduction process is almost completed before 35 years of age.

Table 5.1 Age-specific and total fertility rates and crude birth rates in Tamil Nadu from various sources

Age	NFHS-1 1989-91	Ramanujam and Rajamanickam 1992-94	NFHS-2 1996-98	SRS 1997	Present Survey 2000-2002
15-19	0.087	0.074	0.083	0.031	0.056
20-24	0.203	0.188	0.189	0.179	0.178
25-29	0.132	0.118	0.121	0.124	0.115
30-34	0.051	0.042	0.032	0.045	0.033
35-39	0.019	0.013	0.010	0.011	0.006
40-44	0.004	0.000	0.003	0.003	0.001
45-49	0.000	0.001	0.000	0.001	0.000
TFR 15-44	2.48	2.18	2.19	1.97	1.94
TFR 15-49	2.48	2.18	2.19	1.97	1.94
CBR	23.5	22.1	21.4	19.0	18.2

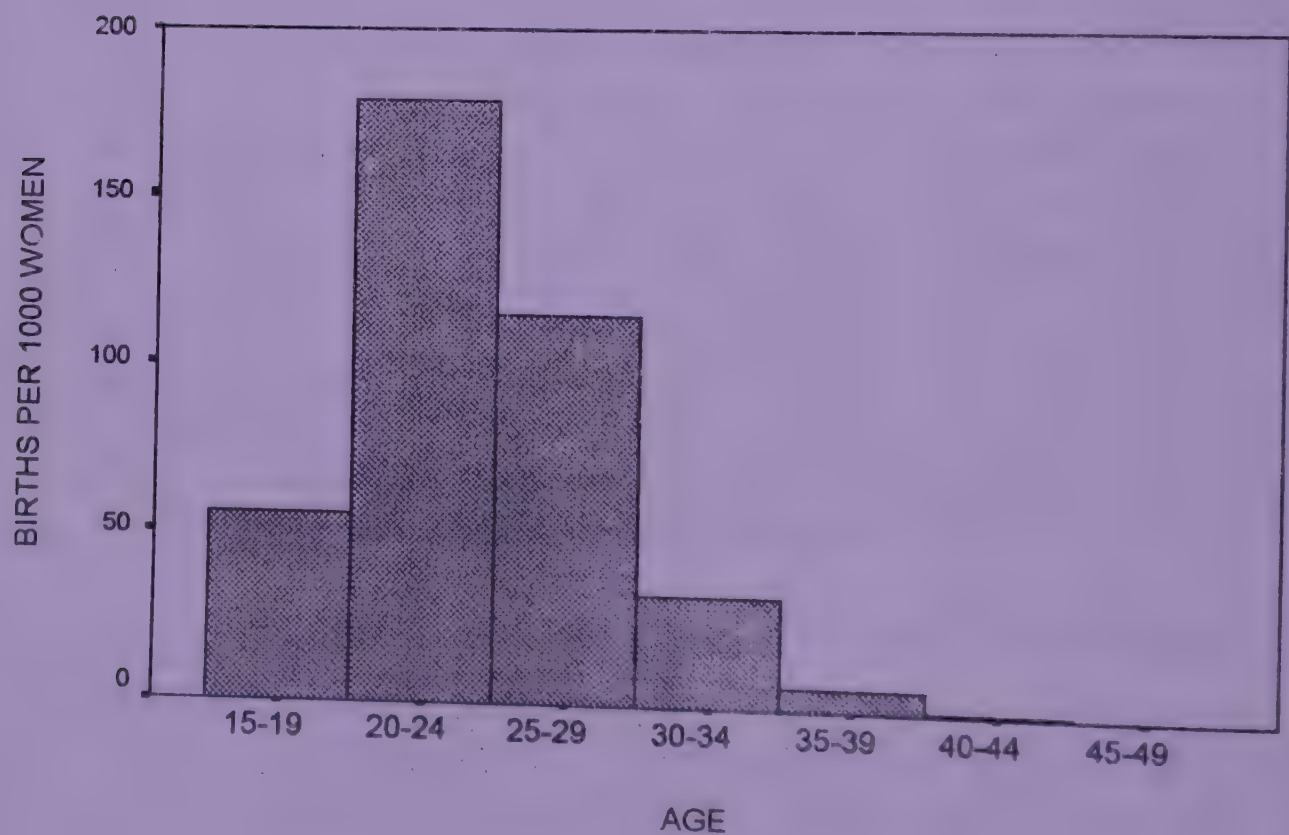


Figure 5.1 Age-specific Fertility Rates

5.2 Children Ever Born and Living

Table 5.2 and 5.3 provide mean number of children ever born, mean children surviving and percent died by sex of child to all women and ever-married women in five year age groups of women aged 15-49. Among the children ever born to women, the sex ratio at birth is 1037 male births per 1000 female births in rural area, 1070 in urban area and 1048 in both areas combined. Normal sex ratio at birth ranges between 1050 and 1060. In comparison the sex ratio at birth is less in rural and more in urban area. However the over all sex ratio is only marginally less than the normal sex ratio. It is also possible that the moderate differences observed are due to sampling error.

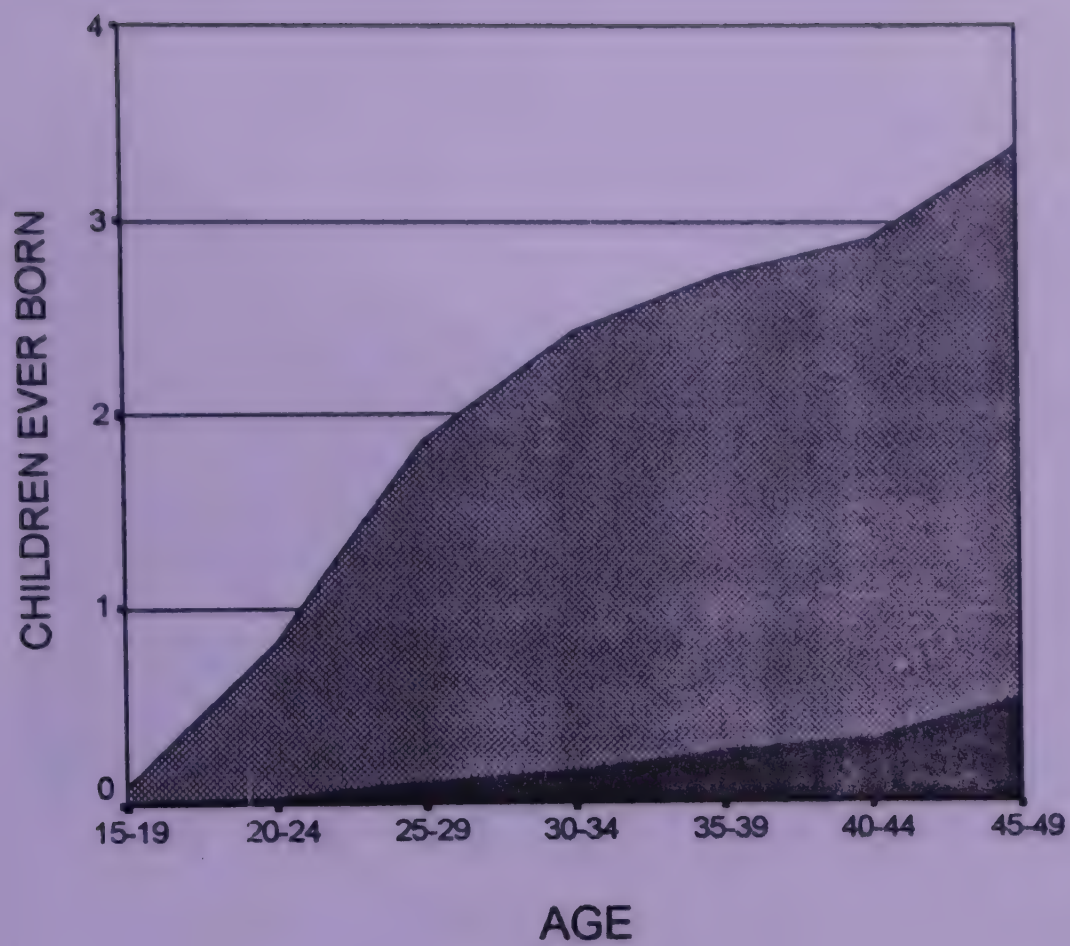
Among all women of age 15-49, the mean number of children ever born is 1.77 (Table 5.2 and Figures 5.2, 5.3 and 5.4). Rural women have on an average 1.83 children born to them whereas the average number of children born to their urban counterparts is 1.68. Rural women start having children slightly early in their life, progress relatively faster and finally end up with an average of 3.39 children, which is about 0.15 children more than that of urban women. Among the children ever born to women, 77 died per every 1000 born to urban women and 92 died to rural women. The mean number of male children born to women in the age range 15 –49 is 1.20 and the mean number of female children is 1.14.

Table 5.3 and Figures 5.5, 5.6 and 5.7 show the mean number of children ever born and living by sex of child, age of women and residence. Ever-married women in the age group 45-49 have an average of 3.42 children born to them. Mean number of children ever born to ever-married women is 2.34 in all, 2.39 to rural women and 2.26 to urban women.

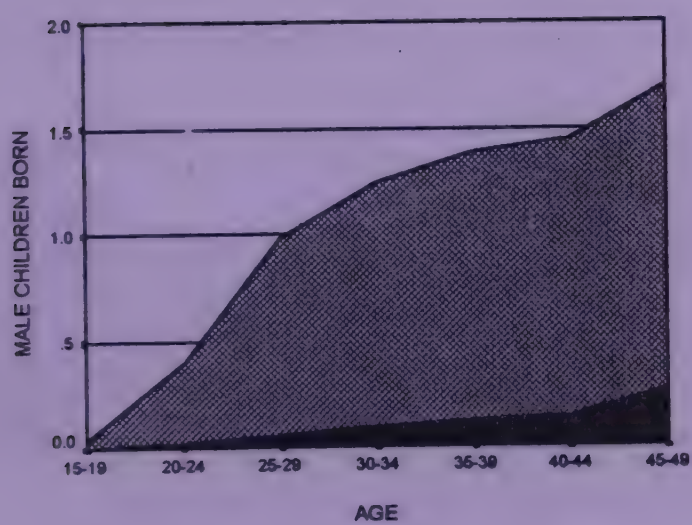
We notice from the age-specific fertility rates that 98 percent of total births take place by age 35 of woman. Hence the mean number of children ever born to women aged 35-39 represents the current fertility better than the experience of women in the age group 45-49. Mean number of children ever born to women aged 35-39 is 2.63 and the mean number of living children is 2.41. This implies a cumulative child loss of 81 per 1000 live births irrespective of age of children. Mean number of children ever born to rural women is 2.73 and to urban women is 2.45 and the respective mean number of living children is 2.48 and 2.31. From these it may be noted that the child loss is 92 per 1000 births in rural area and 59 in urban area.

Table 5.2 Children ever born, children surviving and proportion of children died to all women 15-49 by sex of child and place of residence.

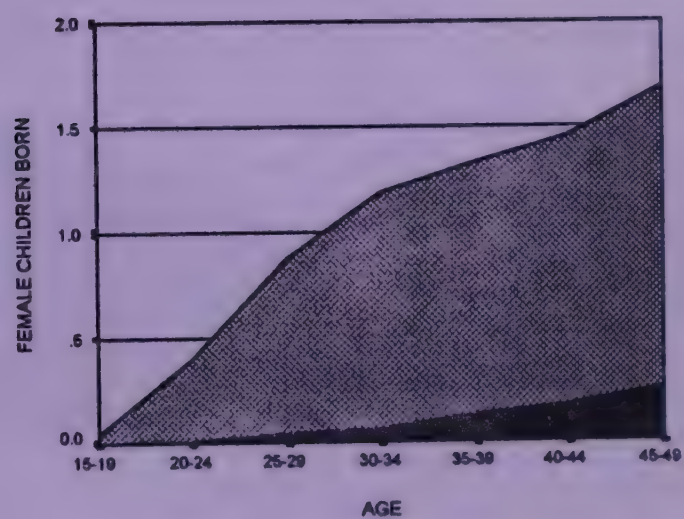
Age of Women	No. of women	Mean number of live births	Mean number of living children	Percent died	Mean number of male live births	Mean number of male living children	Percent male children died	Mean number of female live births	Mean number of female living children
Rural									
15-19	756	0.08	0.07	8.3	0.03	0.03	7.8	0.05	0.04
20-24	671	0.82	0.79	3.1	0.41	0.39	3.7	0.41	0.39
25-29	662	1.86	1.76	5.4	0.98	0.92	5.8	0.88	0.84
30-34	575	2.43	2.28	6.5	1.25	1.15	7.6	1.18	1.12
35-39	559	2.73	2.48	9.2	1.39	1.27	8.7	1.33	1.20
40-44	458	2.91	2.59	11.1	1.45	1.31	10.2	1.46	1.28
45-49	408	3.39	2.86	15.6	1.70	1.43	15.9	1.69	1.43
Total	4089	1.83	1.66	9.2	0.93	0.85	9.2	0.90	0.82
Urban									
15-19	404	0.05	0.05	0.0	0.02	0.02	0.0	0.04	0.04
20-24	421	0.61	0.58	4.7	0.30	0.29	4.9	0.31	0.30
25-29	380	1.62	1.54	5.0	0.81	0.76	6.3	0.82	0.78
30-34	312	2.16	2.03	6.2	1.17	1.08	8.0	0.99	0.95
35-39	307	2.45	2.31	5.9	1.32	1.27	4.3	1.13	1.04
40-44	272	2.97	2.67	10.3	1.49	1.32	11.9	1.48	1.35
45-49	252	3.23	2.86	11.4	1.67	1.44	13.7	1.56	1.42
Total	2348	1.68	1.55	7.7	0.87	0.79	8.7	0.81	0.76
Total									
15-19	1160	0.07	0.07	6.2	0.03	0.03	6.1	0.04	0.04
20-24	1092	0.74	0.71	3.6	0.37	0.35	4.1	0.37	0.36
25-29	1042	1.77	1.68	5.3	0.92	0.86	5.9	0.86	0.82
30-34	887	2.34	2.19	6.4	1.22	1.13	7.7	1.11	1.06
35-39	866	2.63	2.41	8.1	1.37	1.27	7.1	1.26	1.15
40-44	730	2.93	2.62	10.8	1.47	1.31	10.8	1.46	1.31
45-49	660	3.33	2.86	14.0	1.69	1.43	15.1	1.64	1.43
Total	6437	1.77	1.62	8.6	0.91	0.83	9.0	0.87	0.79



(a)



(b)



(c)

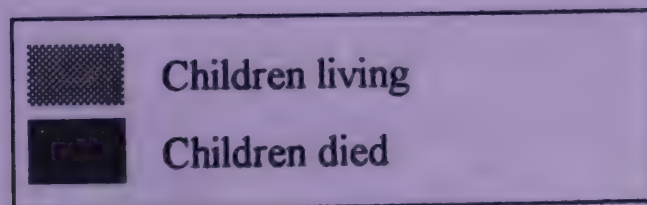
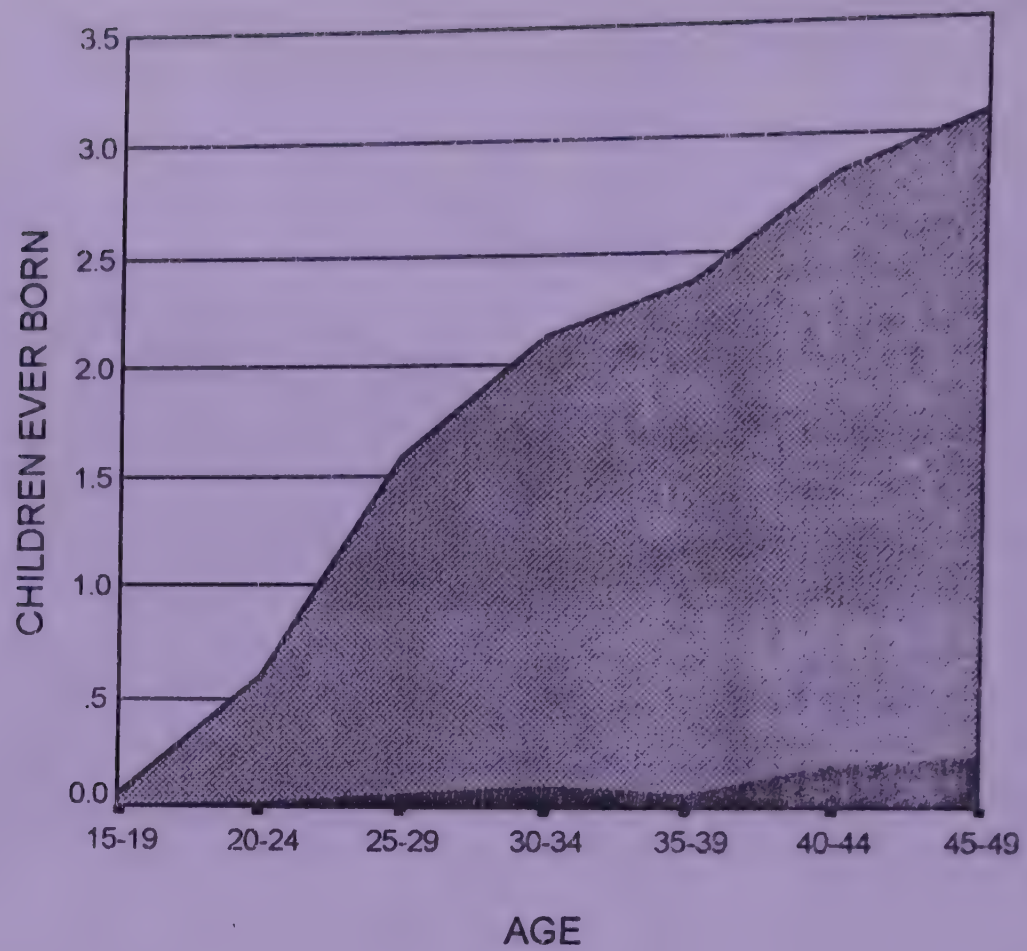
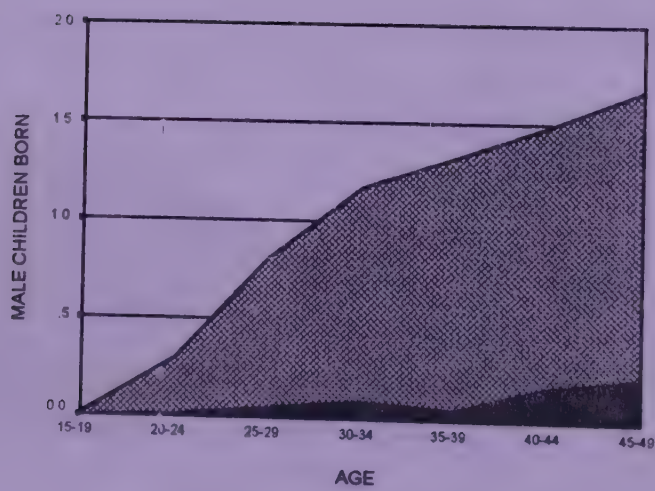


Figure 5.2 Cumulative mean numbers of (a) children ever born, (b) male children born and (c) female children born by age to rural women



(a)



(b)



(c)

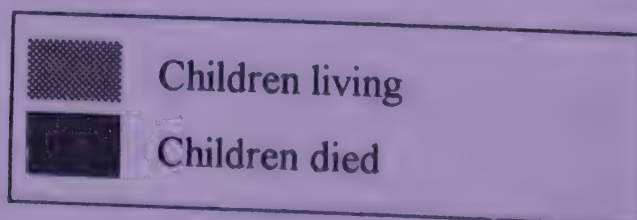
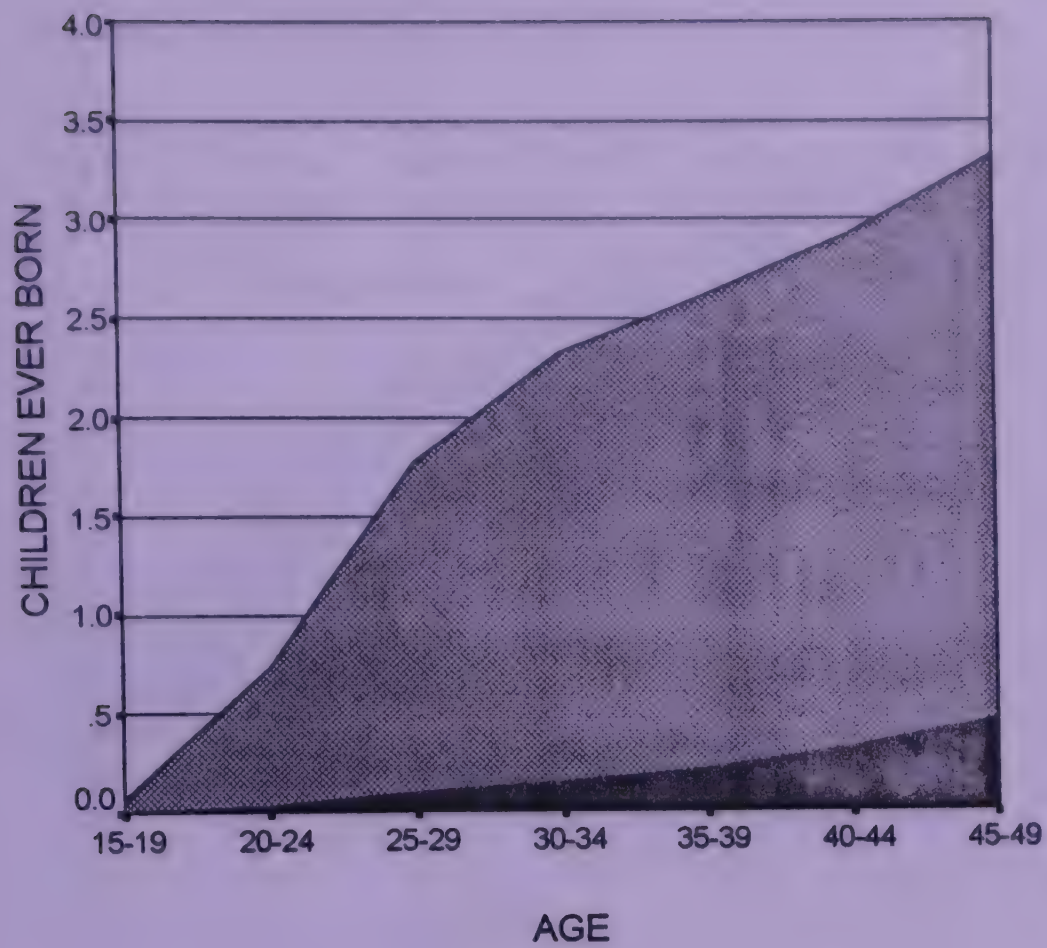
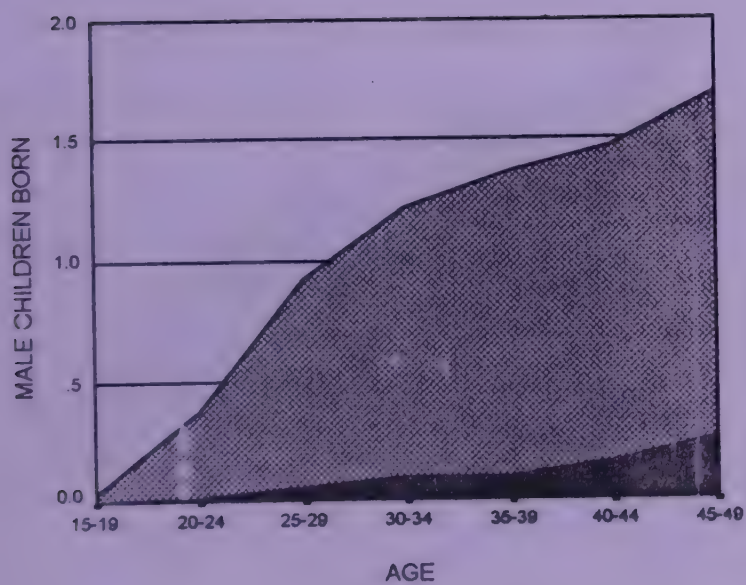


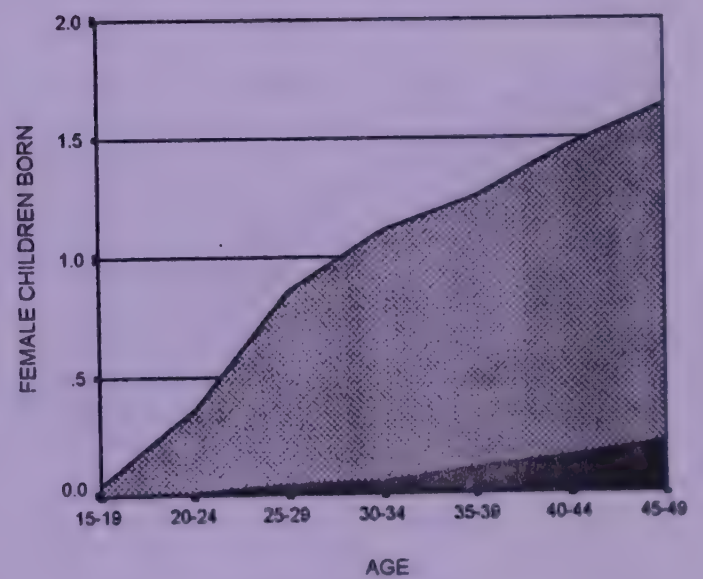
Figure 5.3 Cumulative mean numbers of (a) children ever born, (b) male children born and (c) female children born by age to urban women



(a)



(b)



(c)

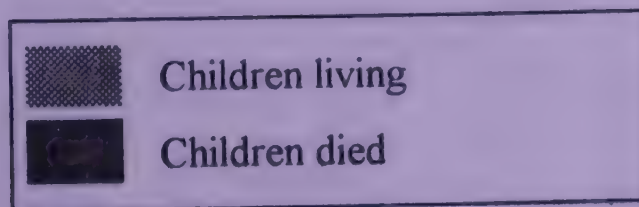
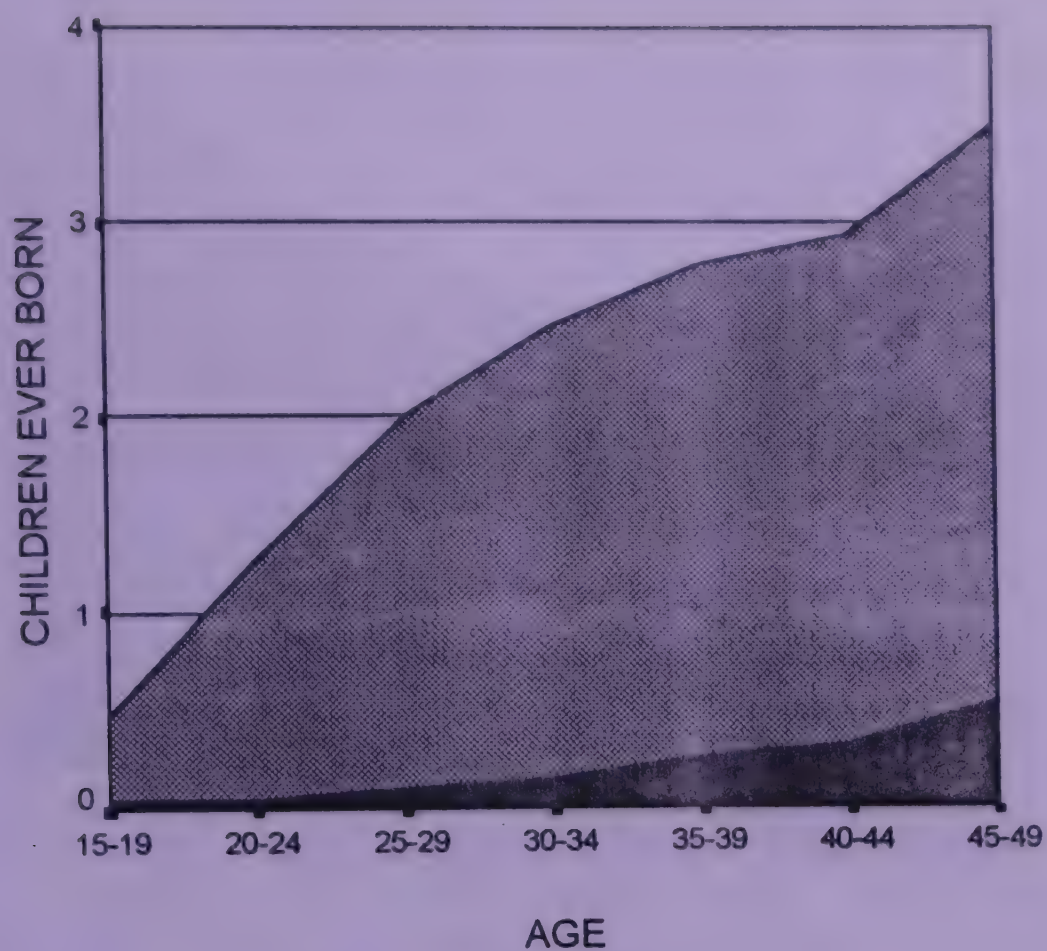


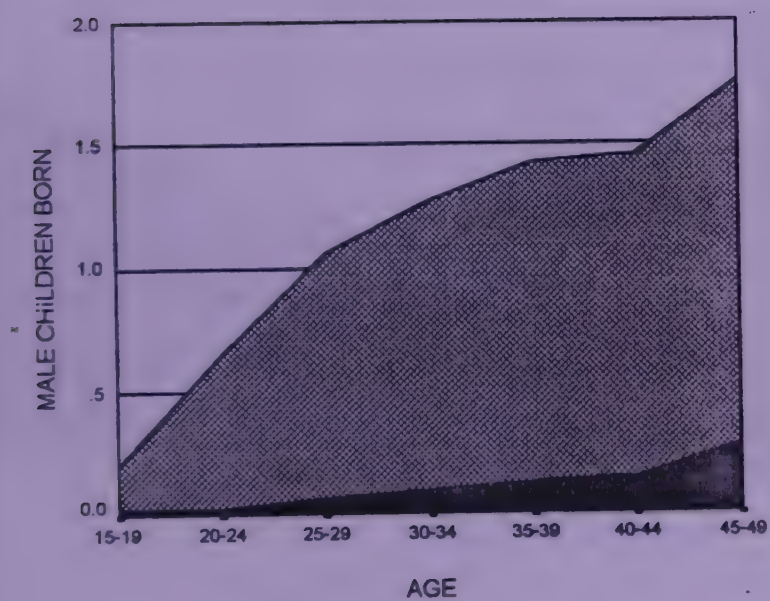
Figure 5.4 Cumulative mean numbers of (a) children ever born, (b) male children born and (c) female children born by age to all women

Table 5.3 Children ever born, children surviving and proportion of children died to ever-married women 15-49 by sex of child and place of residence

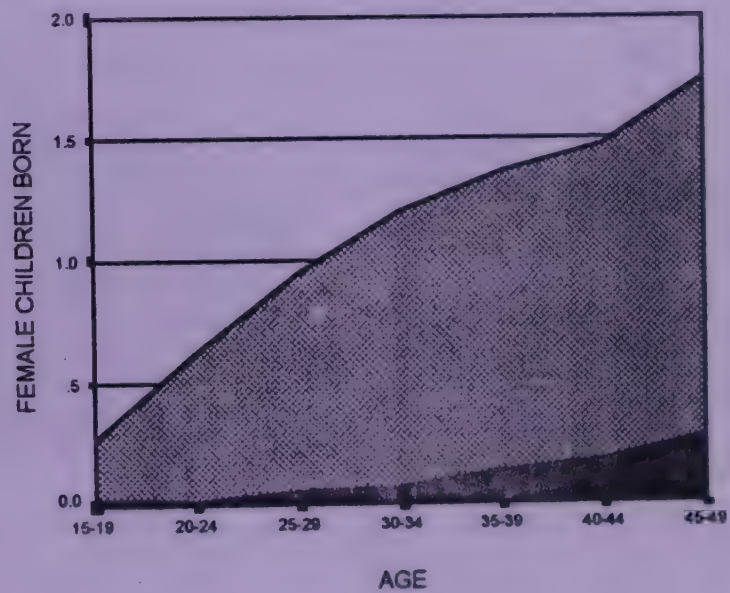
Age of Women	No. of women	Mean number of Live births	Mean number of living children	Percent died	Mean number of male live births	Mean number of male living children	Percent died	Mean number of female live births	Mean number of female living children	Percent died
Rural										
15-19	127	0.47	0.43	8.3	0.20	0.19	7.8	0.27	0.24	
20-24	423	1.27	1.23	3.1	0.64	0.62	3.7	0.63	0.62	
25-29	605	2.01	1.90	5.4	1.06	1.00	5.8	0.95	0.90	
30-34	558	2.47	2.31	6.5	1.27	1.17	7.6	1.20	1.14	
35-39	536	2.80	2.54	9.2	1.43	1.31	8.7	1.37	1.24	
40-44	448	2.93	2.61	11.1	1.46	1.31	10.2	1.47	1.29	
45-49	389	3.50	2.95	15.6	1.76	1.48	15.9	1.74	1.48	
Total	3086	2.39	2.17	9.2	1.22	1.10	9.2	1.17	1.07	
Urban										
15-19	52	0.40	0.40	0.0	0.12	0.12	0.0	0.29	0.29	
20-24	225	1.13	1.08	4.7	0.56	0.53	4.9	0.58	0.55	
25-29	334	1.83	1.73	5.0	0.91	0.85	6.3	0.92	0.88	
30-34	305	2.18	2.05	6.2	1.19	1.09	8.0	1.00	0.96	
35-39	297	2.51	2.36	5.9	1.35	1.30	4.3	1.15	1.06	
40-44	271	2.95	2.65	10.3	1.48	1.31	11.9	1.47	1.34	
45-49	244	3.30	2.93	11.4	1.71	1.48	13.7	1.59	1.45	
Total	1728	2.26	2.08	7.7	1.17	1.07	8.7	1.09	1.02	
Total										
15-19	179	0.45	0.42	6.2	0.18	0.17	6.1	0.27	0.26	
20-24	648	1.23	1.18	3.6	0.61	0.59	4.1	0.61	0.59	
25-29	939	1.94	1.84	5.3	1.00	0.94	5.9	0.94	0.90	
30-34	863	2.37	2.22	6.4	1.24	1.14	7.7	1.13	1.07	
35-39	833	2.70	2.48	8.1	1.40	1.30	7.1	1.29	1.18	
40-44	719	2.94	2.62	10.8	1.47	1.31	10.8	1.47	1.31	
45-49	633	3.42	2.94	14.0	1.74	1.48	15.1	1.69	1.47	
Total	4814	2.34	2.14	8.6	1.20	1.09	9.0	1.14	1.05	



(a)



(b)



(c)

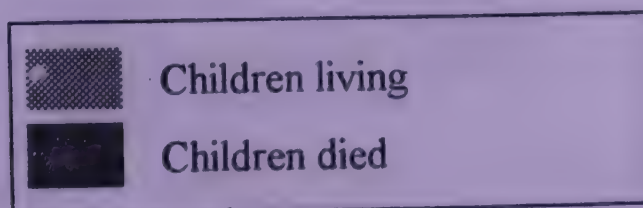
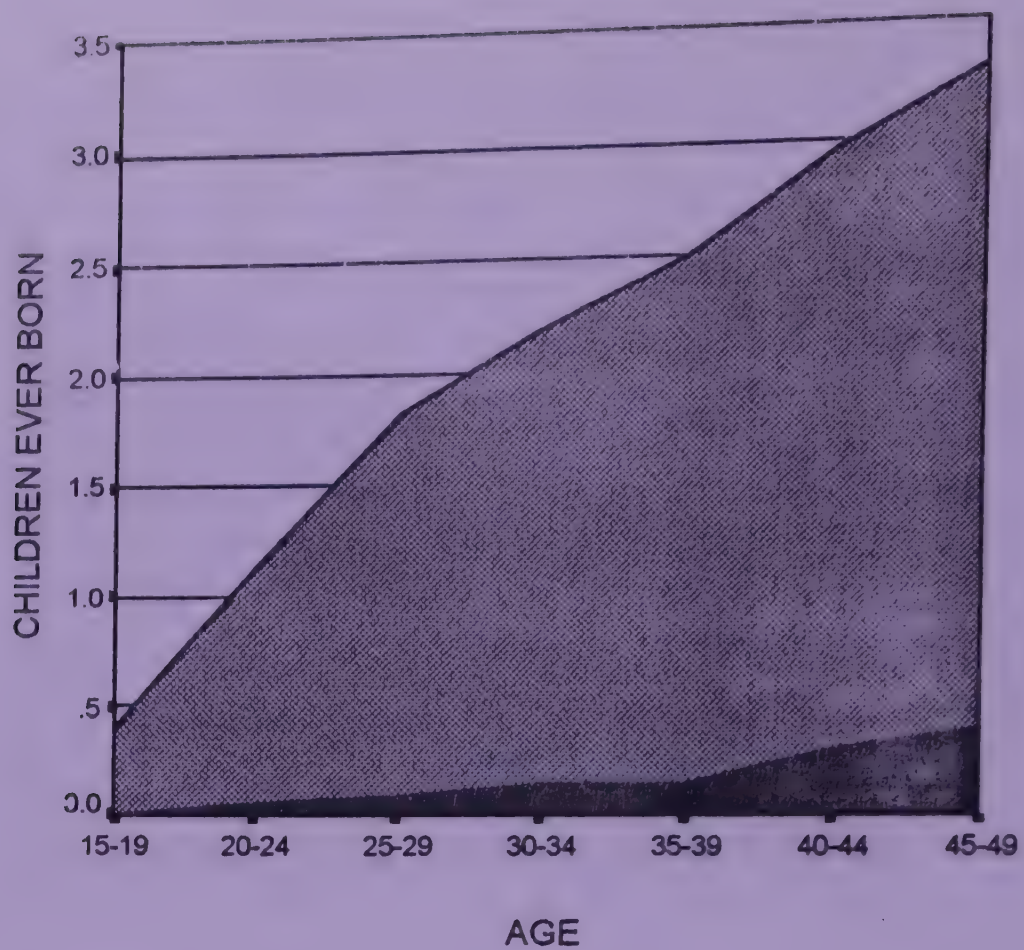
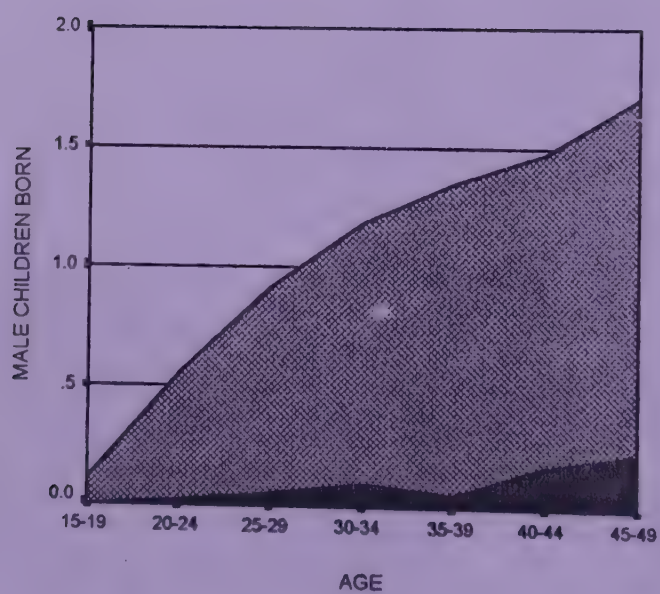


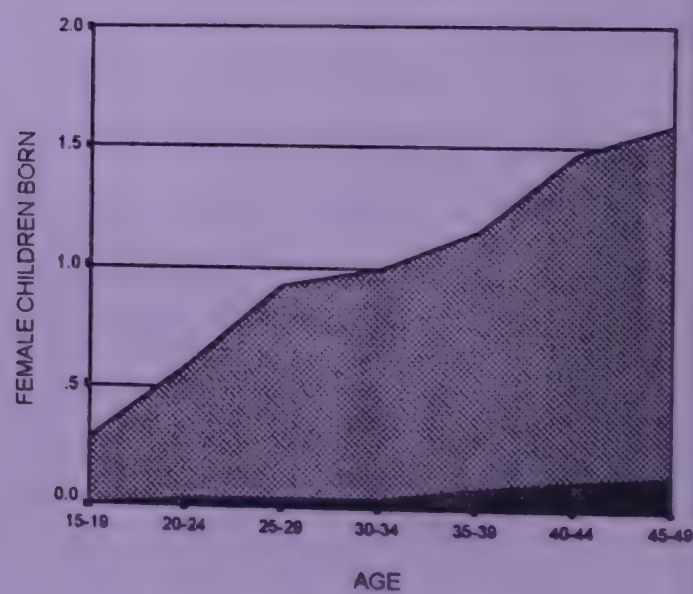
Figure 5.5 Cumulative mean numbers of (a) children ever born, (b) male children born and (c) female children born by age to rural ever-married women



(a)



(b)



(c)

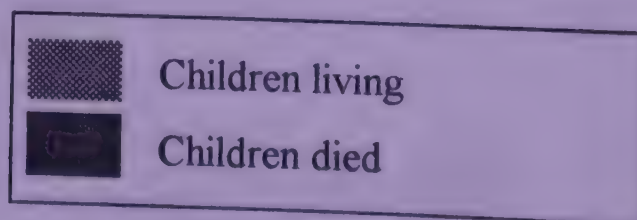
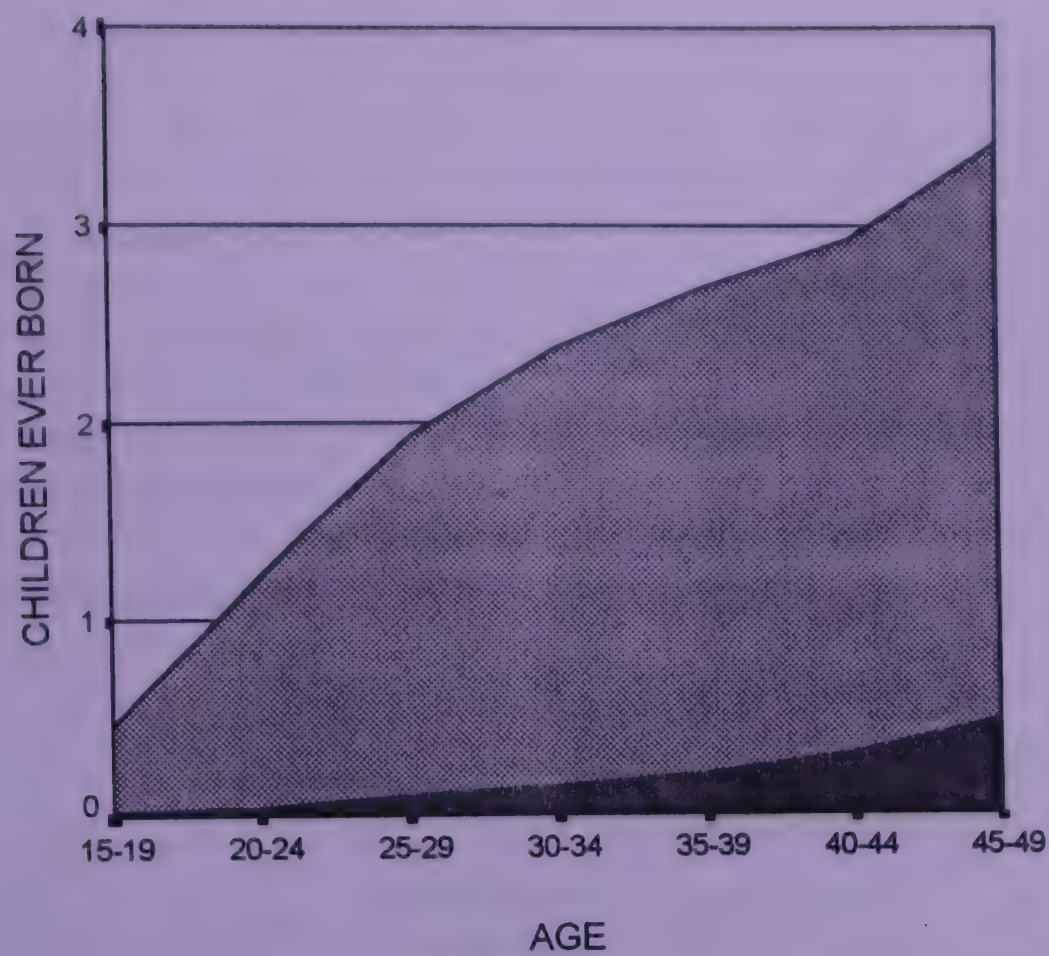
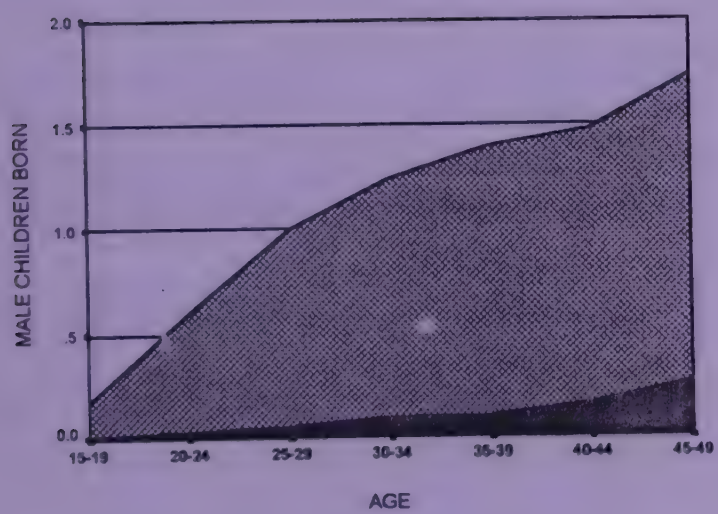


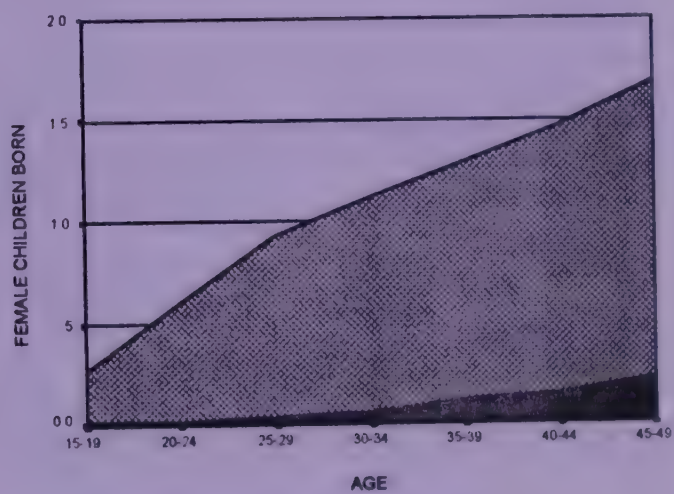
Figure 5.6 Cumulative mean numbers of (a) children ever born, (b) male children born and (c) female children born by age to urban ever-married women



(a)



(b)



(c)

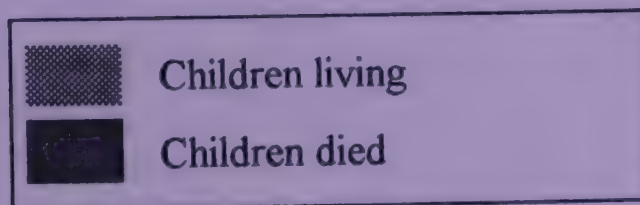


Figure 5.7 Cumulative mean numbers of (a) children ever born, (b) male children born and (c) female children born by age to all ever-married women

5.3 Infant and Child Mortality

The date of birth and date of death of child are likely to be more accurate for those births that took place closer to the date of survey. Therefore, births that occurred during six years preceding the date of survey are taken for infant and child mortality analysis. Life table has been constructed taking a month as time interval. The life table is provided in Appendix F. From the life table the Infant Mortality Rate (${}_1q_0$) in Tamil Nadu is computed as 39.1 per 1000 live births (Table 5.4). The Neonatal Mortality Rate is 26.7. By subtraction the Post-neonatal Mortality Rate is 12.4. The number of deaths in the first 5 years of life for every 1000 live-born is 45.8. The table also provides childhood mortality rate from various sources. It may be observed that the estimates from NFHS-1, Ramanujam and Rajamanickam, NFHS-2 and the present survey fall in a downward-sloped straight line. The estimate from Sample Registration System is above the straight line implying a higher estimate. The present survey finding is consistent with the results of NFHS surveys and that of Ramanujam and Rajamanickam.

Table 5.4 Mortality among children from various sources

Source	Reference Period	Neonatal mortality rate	Post-neonatal mortality rate	Infant mortality rate (${}_1Q_0$)	Child mortality rate (${}_5Q_0$)
NFHS-1, Tamil Nadu, 1991	1987-1991	46.2	21.5	67.7	86.5
Ramanujam and Rajamanickam, 1995	1990-1994	43.7	17.6	61.3	77.3
NFHS-2, Tamil Nadu, 1999	1994-1998	34.8	13.3	48.2	63.3
Sample Registration System, 2003	2001	NA	NA	49	NA
Present survey, 2003	1997- Mid 2003	26.7	12.4	39.1	45.8

CHAPTER 6

PREGNANCY OUTCOME

This chapter is devoted to the analysis of the incidence of various outcomes. Average cumulative number of outcomes by nature and age of women, trend in the percent distribution by nature of outcomes and age-specific rates of various outcomes are provided. Change in the proportions of spontaneous abortions and induced abortions by order of conception and by gestational period are also discussed. The dependence of nature of outcome on the earlier outcome is also inquired. Socio-economic differentials in the percent distribution of outcomes by nature are also examined. Attempts are made to estimate the quantum of under-enumeration of spontaneous abortions and sex selective induced abortions. Finally an estimate of the percent of unregistered induced abortions and estimates of annual incidences of various outcomes in Tamil Nadu are provided.

6.1 Average Number of Pregnancy Outcomes by Age of Women

Mean cumulative number of outcomes (live birth, stillbirth, spontaneous and induced abortions) of all women is given in five-year age groups in Table 6.1. It is assumed here that never-married women had no pregnancies up to survey date. The mean number of outcomes among women in the age group 15-49 is 2.13 for rural women, 1.98 for urban women and 2.07 for all women. Out of 2.07 outcomes per woman, 1.77 are live births, 0.05 are stillbirths, 0.15 are spontaneous abortions and the remaining 0.10 are induced abortions. That is 85.5 percent are live births, 2.3 are stillbirths, 7.1 are spontaneous abortions and 5.0 are induced abortions. The mean number of live births and stillbirths increase almost proportionately by age of woman. But the mean number of induced abortions increases faster after age 25 (Figure 6.1). This suggests that induced abortions are resorted to largely after age 25. Mean number of spontaneous abortions increases by age rapidly at younger ages and slowly at older ages of women.

Table 6.2 provides mean cumulative number of live births, stillbirths, spontaneous abortions and induced abortions by five-year age groups of ever-married women. Except for the level the pattern remains the same as in the case of all women. Mean number of outcomes to ever-married women in the age range 15-49 is 2.74, out of which 2.34 are live births, 0.06 are stillbirths, 0.20 are spontaneous abortions and 0.14 are induced abortions. A comparison of the reproductive performance between rural and urban ever-married women shows that the mean number of outcomes is larger among rural women but the incidence of induced abortion is higher among urban women. It also shows that the incidence of stillbirths is marginally higher among rural women. There is no perceptible change in the incidence of stillbirths by age of women. Further the incidence of spontaneous abortion is high at younger ages and declines as age of woman increases.

6.2 Trend in Percent of Various Outcomes

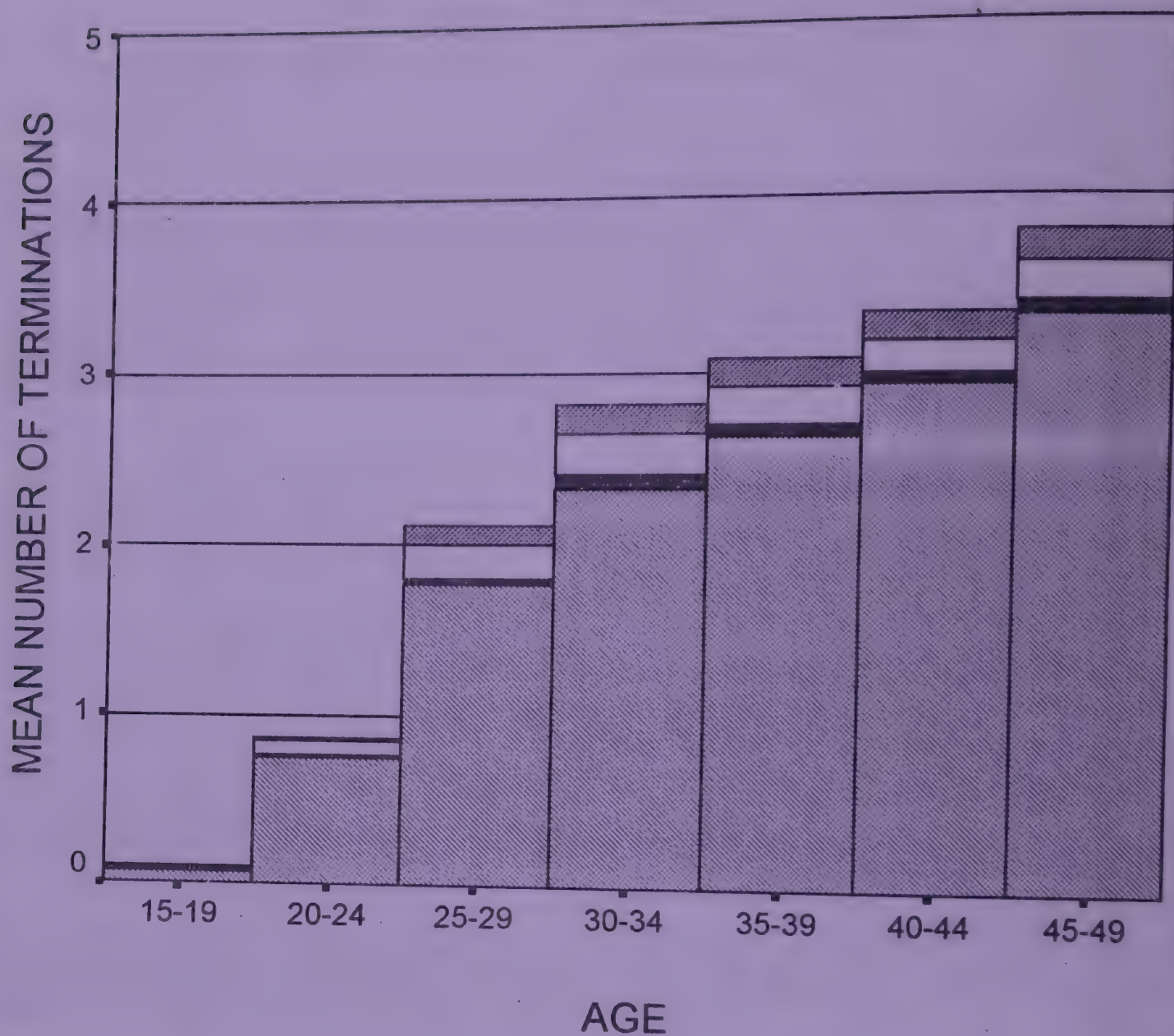
Table 6.3 and Figure 6.2 are drawn to identify the trend, if any, in the proportion of various outcomes over time. There were 13109 outcomes to the sample women in their lifetime. The percent distribution of various outcomes within each time interval for these outcomes is computed. The percent of outcomes ending as live births shows a declining trend from 90 percent prior to 1982 to 83 percent during 1998-2003. The percent of spontaneous abortions shows an increasing trend from 5.6 percent to 9.0 percent during the same time periods. It is hard to believe that the proportion of spontaneous abortions could have increased over time. This trend is likely to be the result of recall error. It is possible that spontaneous abortions occurred long time back, particularly early spontaneous abortions, are forgotten by respondents and are less likely to be reported in the survey. Similarly the percent of induced abortions also shows an increasing trend from 2.4 percent to 7.3 percent. The role of recall lapse in the observed increasing trend in the percent of induced abortions cannot absolutely be ruled out. At the same time it is also possible that there is a genuine increase in the proportion of induced abortions due to liberalization of abortion, increasing availability of service and increasing demand for small family.

A comparison of rural and urban areas show that the yearly change observed in the percent distribution of various outcomes remain the same in both the places. The only difference between urban and rural areas is that the percent of induced abortions is higher in urban area and to that extent the percent of live births is lower in urban area than in rural area. During 1998-2003 the percent of induced abortions is 8.7 in urban and 6.3 in rural areas.

The survey made efforts to get reliable information on pregnancy outcomes through out the reproductive span of women. Further, special efforts are made to get very reliable and detailed information for the period 1997 and after. Hence, the percent distributions of outcomes for the two periods, viz., before 1997 and after 1996, are specifically tabulated. This tabulation (Table 6.4) clearly shows that the incidences of spontaneous and induced abortions are more during the recent period than in the past. The percent of induced abortions during the recent period is 7.0, 8.0 in urban area and 6.4 in rural area. Percent of spontaneous abortions is almost the same (about 9.3) in both the areas. Overall the percent of wastage is 17.9 and it is 19.3 in urban area and 17.2 in rural area in the recent period.

Table 6.1 Pregnancy outcomes, live births (LB), stillbirths (SB), spontaneous abortions (SA) and induced abortions (IA) to all women 15-49 by age at survey and place of residence

Age of women	Number of women	Number of outcomes	Mean number of outcomes	Mean number of LB	Percent LB	Mean number of SB	Percent SB	Mean number of SA	Percent SA	Mean number of IA	Percent IA
Rural											
15-19	756	79	0.106	0.081	76.4	0.003	2.8	0.020	18.9	0.003	2.8
20-24	671	628	0.953	0.816	85.6	0.023	2.4	0.101	10.6	0.014	1.5
25-29	662	1420	2.193	1.863	84.9	0.040	1.8	0.190	8.7	0.100	4.6
30-34	575	1663	2.943	2.435	82.7	0.095	3.2	0.238	8.1	0.175	5.9
35-39	559	1743	3.166	2.726	86.1	0.089	2.8	0.189	6.0	0.163	5.2
40-44	458	1479	3.290	2.910	88.5	0.066	2.0	0.166	5.1	0.146	4.4
45-49	408	1535	3.844	3.387	88.1	0.097	2.5	0.202	5.3	0.159	4.1
Total	4089	8537	2.130	1.829	85.9	0.053	2.5	0.149	7.0	0.098	4.6
Urban											
15-19	404	25	0.063	0.053	84.1	0.000	0.0	0.008	12.7	0.003	4.8
20-24	421	294	0.713	0.612	85.8	0.007	1.0	0.067	9.4	0.026	3.7
25-29	380	736	1.969	1.623	82.4	0.032	1.6	0.189	9.6	0.125	6.4
30-34	312	784	2.573	2.158	83.9	0.078	3.0	0.178	6.9	0.159	6.2
35-39	307	882	2.915	2.454	84.2	0.059	2.0	0.224	7.7	0.178	6.1
40-44	272	919	3.431	2.974	86.7	0.063	1.8	0.204	6.0	0.190	5.5
45-49	252	932	3.752	3.234	86.2	0.072	1.9	0.225	6.0	0.221	5.9
Total	2348	4572	1.980	1.683	85.0	0.040	2.0	0.145	7.3	0.115	5.8
Total											
15-19	1160	104	0.091	0.071	78.0	0.002	2.2	0.016	17.6	0.003	3.3
20-24	1092	922	0.860	0.737	85.7	0.017	2.0	0.088	10.2	0.019	2.2
25-29	1042	2156	2.110	1.775	84.1	0.037	1.8	0.190	9.0	0.109	5.2
30-34	887	2447	2.811	2.336	83.1	0.089	3.2	0.217	7.7	0.169	6.0
35-39	866	2615	3.075	2.628	85.5	0.078	2.5	0.201	6.5	0.168	5.5
40-44	730	2398	3.341	2.933	87.8	0.065	1.9	0.180	5.4	0.162	4.9
45-49	660	2467	3.807	3.327	87.4	0.088	2.3	0.210	5.5	0.183	4.8
Total	6437	13109	2.074	1.774	85.5	0.048	2.3	0.147	7.1	0.104	5.0



LEGEND





-  Live births
-  Stillbirths
-  Spontaneous abortions
-  Induced abortions

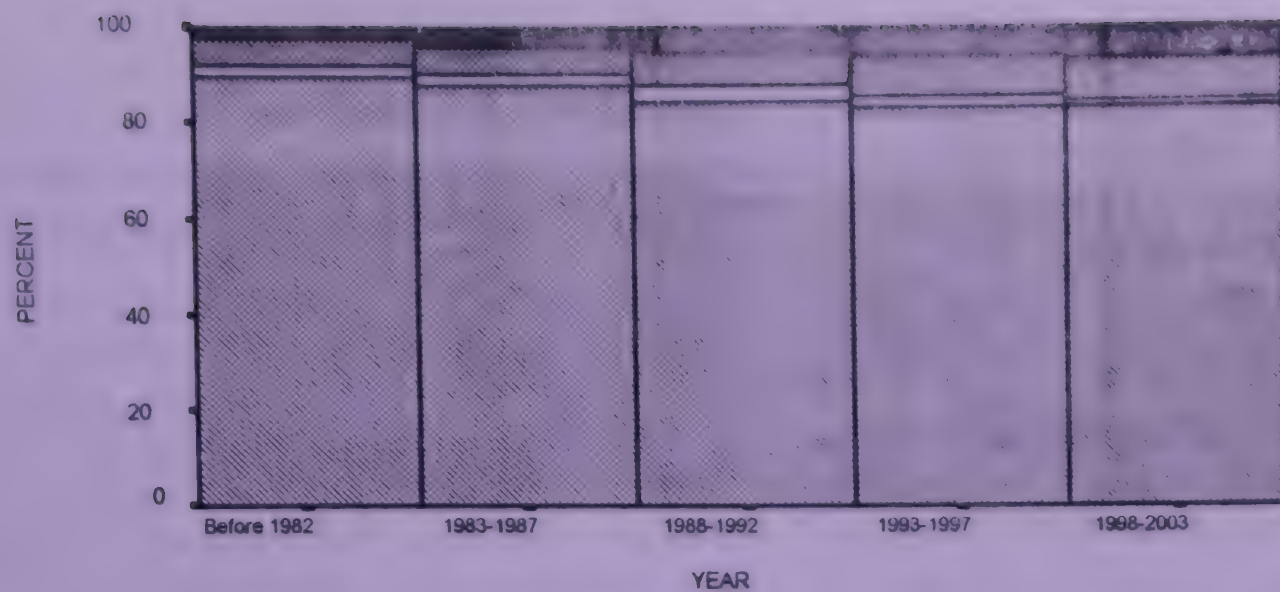
Figure 6.1 Mean cumulative number of outcomes by nature to all women in different age groups

Table 6.2 Pregnancy outcomes, live births (LB), stillbirths (SB), spontaneous abortions (SA) and induced abortions (IA) to ever-married women 15-49 by age at survey and place of residence

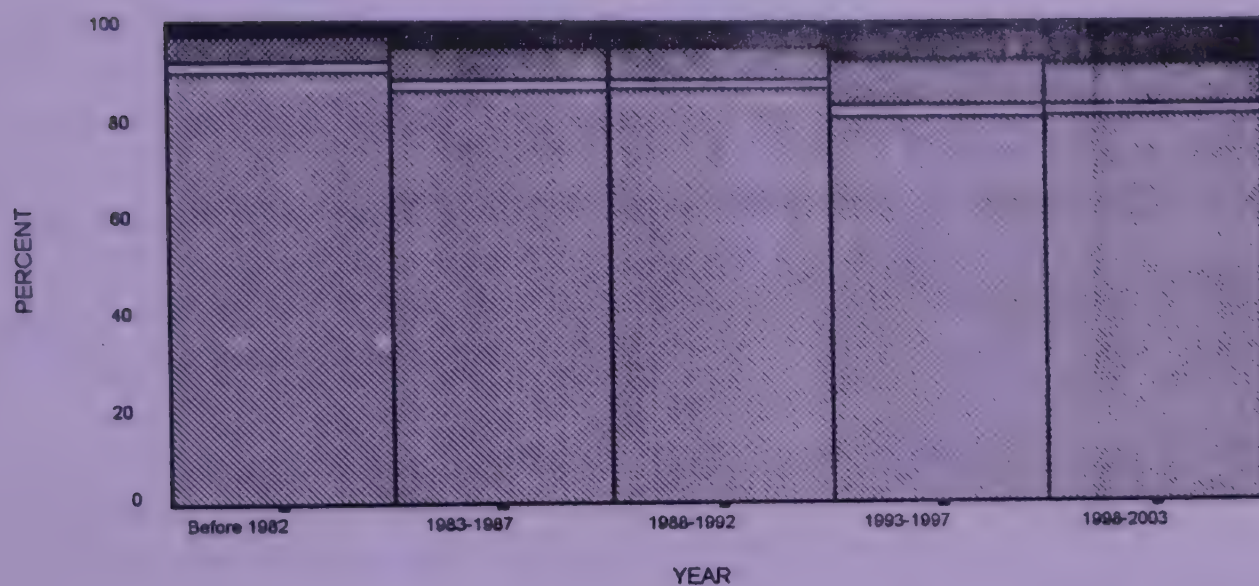
Age of women	Number of women	Number of outcomes	Mean number of outcomes	Mean number of LB	Percent LB	Mean number of SB	Percent SB	Mean number of SA	Percent SA	Mean number of IA	Percent IA
Rural											
15-19	127	79	0.622	0.472	75.9	0.016	2.6	0.118	19.0	0.016	2.6
20-24	423	628	1.489	1.274	85.6	0.035	2.4	0.158	10.6	0.021	1.4
25-29	605	1420	2.364	2.008	84.9	0.043	1.8	0.205	8.7	0.107	4.5
30-34	558	1663	2.987	2.471	82.7	0.097	3.3	0.242	8.1	0.177	5.9
35-39	536	1743	3.252	2.800	86.1	0.091	2.8	0.194	6.0	0.168	5.2
40-44	448	1479	3.313	2.931	88.5	0.067	2.0	0.167	5.0	0.147	4.4
45-49	389	1535	3.972	3.499	88.1	0.100	2.5	0.208	5.2	0.165	4.2
Total	3086	8537	2.780	2.388	85.9	0.070	2.5	0.195	7.0	0.128	4.6
Urban											
15-19	52	25	0.481	0.404	84.0	0.000	0.0	0.058	12.1	0.019	3.9
20-24	225	294	1.320	1.133	85.8	0.013	1.0	0.124	9.4	0.049	3.7
25-29	334	736	2.216	1.826	82.4	0.036	1.6	0.213	9.6	0.141	6.4
30-34	305	784	2.603	2.184	83.9	0.079	3.0	0.180	6.9	0.161	6.2
35-39	297	882	2.990	2.508	83.9	0.061	2.0	0.229	7.7	0.182	6.1
40-44	271	919	3.406	2.952	86.7	0.063	1.9	0.208	6.1	0.188	5.5
45-49	244	932	3.832	3.303	86.2	0.074	1.9	0.230	6.0	0.225	5.9
Total	1728	4572	2.661	2.259	84.9	0.053	2.0	0.194	7.3	0.155	5.8
Total											
15-19	179	104	0.581	0.453	78.0	0.011	1.9	0.101	17.4	0.017	2.9
20-24	648	922	1.431	1.225	85.6	0.028	1.9	0.147	10.3	0.031	2.2
25-29	939	2156	2.311	1.944	84.1	0.040	1.7	0.208	9.0	0.119	5.2
30-34	863	2447	2.852	2.370	83.1	0.090	3.2	0.220	7.7	0.171	6.0
35-39	833	2615	3.155	2.696	85.5	0.080	2.5	0.206	6.5	0.173	5.5
40-44	719	2398	3.348	2.939	87.8	0.065	1.9	0.181	5.4	0.163	4.9
45-49	633	2467	3.918	3.423	87.4	0.090	2.3	0.216	5.5	0.188	4.8
Total	4814	13109	2.737	2.341	85.5	0.064	2.3	0.195	7.1	0.138	5.0

Table 6.3 Trends in pregnancy outcomes by place of residence

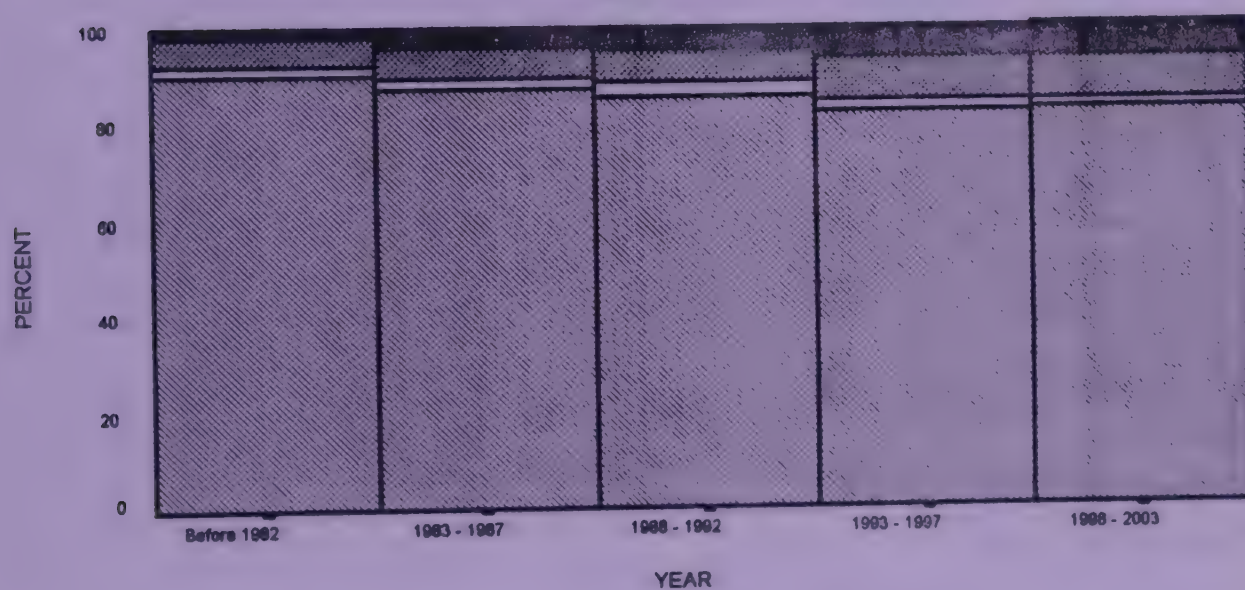
Period	Number of outcomes	Percentage of				Total
		Live births	Stillbirths	Spontaneous abortions	Induced abortions	
Rural						
Before 1982	2033	89.6	2.6	5.6	2.2	100.0
1983-1987	1668	88.0	2.3	5.6	4.1	100.0
1988-1992	1724	84.5	3.6	6.8	5.1	100.0
1993-1997	1605	83.2	2.2	8.6	6.0	100.0
1998-2003	1507	83.1	1.6	9.0	6.3	100.0
Total	8537	85.9	2.5	7.0	4.6	100.0
Urban						
Before 1982	1130	89.7	1.9	5.6	2.8	100.0
1983-1987	970	85.6	2.2	6.9	5.4	100.0
1988-1992	813	86.2	1.7	6.7	5.4	100.0
1993-1997	807	80.3	2.3	9.4	8.0	100.0
1998-2003	852	80.7	1.9	8.7	8.7	100.0
Total	4572	84.9	2.0	7.3	5.8	100.0
Total						
Before 1982	3163	90.1	2.4	5.6	2.4	100.0
1983-1987	2638	87.4	2.3	6.1	4.6	100.0
1988-1992	2537	85.6	3.0	6.8	5.2	100.0
1993-1997	2412	82.6	2.2	8.9	6.7	100.0
1998-2003	2359	82.8	1.7	9.0	7.3	100.0
Total	13109	85.5	2.3	7.1	5.0	100.0



(a)



(b)



(c)



Figure 6.2 Trend in the percent distribution of outcomes to (a) rural, (b) urban and (c) all women by nature

Table 6.4 Percent distribution of pregnancy outcomes to ever-married women before 1997 and 1997 and after by place of residence

Pregnancy outcomes	Before 1997		1997 and after		Total	
	Number	Percent	Number	Percent	Number	Percent
Rural						
Live births	5859	86.7	1509	82.8	7368	85.9
Stillbirths	187	2.8	28	1.5	215	2.5
Spontaneous abortions	432	6.4	169	9.3	601	7.0
Induced abortions	279	4.1	116	6.4	395	4.6
Urban						
Live births	3079	86.1	824	80.7	3903	84.9
Stillbirths	71	2.0	21	2.1	92	2.0
Spontaneous abortions	242	6.8	94	9.2	336	7.3
Induced abortions	186	5.2	82	8.0	268	5.8
Total						
Live births	8938	86.5	2333	82.1	11271	85.5
Stillbirths	258	2.5	49	1.7	307	2.3
Spontaneous abortions	674	6.5	263	9.3	937	7.1
Induced abortions	465	4.5	198	7.0	663	5.0

6.3 Incidence of Various Pregnancy Outcomes

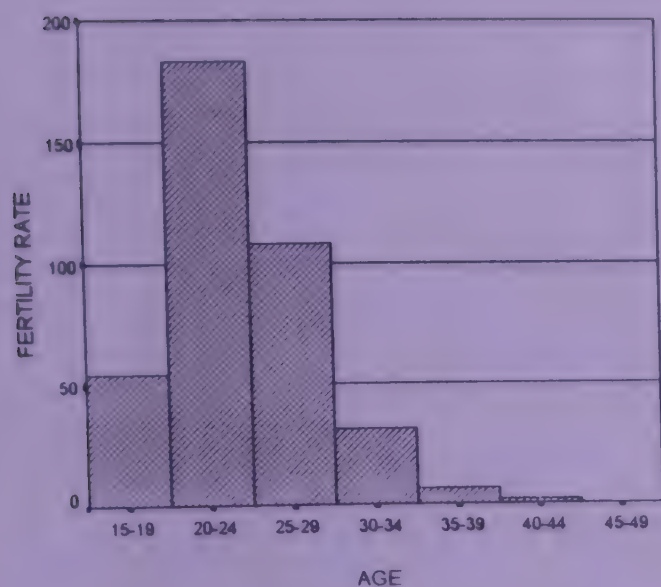
Table 6.5 presents the pregnancy outcomes during the 5 years preceding the survey by age at the time of outcome. The time period of five years is necessitated in order to get sufficient number of events in each type of pregnancy outcome for the computation of rates. Using the single year distribution of all women, woman years of exposure in each age group for a period of five years is computed. This serves as the denominator for computation of age-specific rates. The age-specific rates are given as the number of events occurred per 1000 woman years in the given age group. Number of live births per 1000 woman years of exposure is the conventional age-specific fertility rate. The peak age-specific rate is in the age group 20-24 (Figure 6.3 a). So also are the age-specific stillbirth rates and age-specific spontaneous abortion rates (Figures 6.3 b and c). However, the peak age-specific induced abortion rate is in the age group 25-29 (Figure 6.3 d). While all the other rates are skewed to the left, age-specific induced abortion rate looks more symmetric. Overall at the current rates of age-specific birth, stillbirth, spontaneous abortion and induced abortion, a woman at the end of her reproductive period would have 2.35 outcomes of pregnancies, out of which 1.92 are live births, 0.04 are stillbirths, 0.21 are spontaneous abortions and 0.18 are induced abortions. In terms of percentage the live births are 82.2, stillbirths are 1.7, spontaneous abortions are 8.9 and induced abortions are 7.1.

Figure 6.4 drawn to show the share of different types of pregnancy outcomes by age of mother at the time of outcome for the outcomes that took place after 1996, clearly indicates that induced abortions gain momentum after age 25 and continues to increase as age of woman increases. This is a clear indication that induced abortion is increasingly used to limit family size at the older ages. Nonuse of contraception or ineffective use of contraception may be responsible for undesired pregnancies that are induced. It is also possible to argue that sex selection may also contribute to increase in induced abortions at ages beyond 25. This may have to be supported by change in sex ratio at birth, which is not observed in the present study as stated in Chapter 5. Hence it is to be concluded that the increasing incidence of induced abortions is almost entirely due to efforts to space or limit family size. It is also seen that the proportion of spontaneous abortions is more among the outcomes occurring at the early ages. At the advanced age the proportion of spontaneous abortions is very small. This clearly indicates that the incidence of spontaneous abortions is more among young women and less among older women.

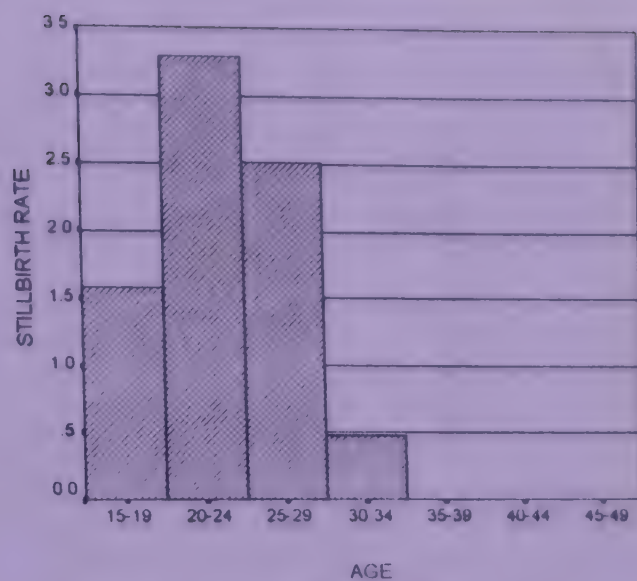
Table 6.5 Pregnancy outcome rates during five years preceding the survey

Age	Women years	Number of outcomes	Age-specific					Percent distribution of outcomes			
			Fertility rate ¹	Still- birth rate ¹	Sponta- neous abortion rate ¹	Induced abortion rate ¹	Outcome rate ¹	Live births	Still- births	Sponta- neous abortions	Induced abortions
15-19	5700	371	54.04	1.58	7.72	1.75	65.09	83.0	2.4	11.9	2.7
20-24	5179	1106	183.24	3.28	18.73	8.30	213.55	85.8	1.5	8.8	3.9
25-29	4789	632	107.96	2.51	9.40	12.11	231.98	81.8	1.9	7.1	9.2
30-34	4298	199	31.18	0.47	5.35	9.31	46.31	67.3	1.0	11.6	20.1
35-39	3956	41	6.57	0.00	0.51	3.29	10.37	63.4	0.0	4.9	31.7
40-44	3401	9	1.76	0.00	0.00	0.88	2.64	(66.7)	(0.0)	(0.0)	(33.3)
45-49	2370	1	0.00	0.00	0.00	0.42	0.42	(0.0)	(0.0)	(0.0)	(100.0)
Total Rate ²	NA	NA	1.92	0.04	0.21	0.18	2.35	NA	NA	NA	NA
Percent	NA	2359	NA	NA	NA	NA	NA	82.2	1.7	8.9	7.1

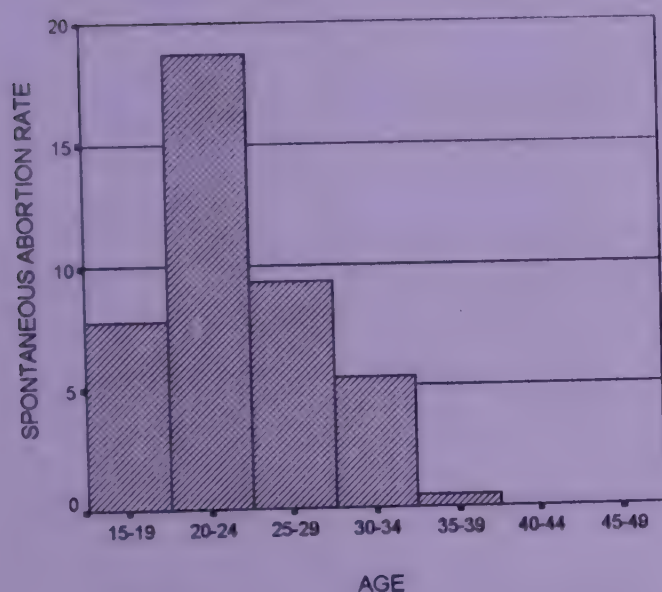
Note : ¹ Rates are events per 1000 women.
² Expected number of events per woman at the end of reproductive life.
 NA Not applicable.
 Figures in parentheses are based on very small number of observations.



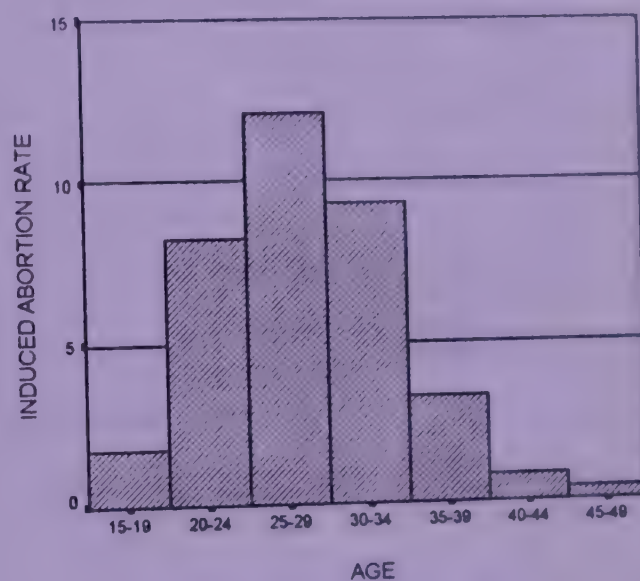
(a) Age-specific fertility rate



(b) Age-specific stillbirth rate

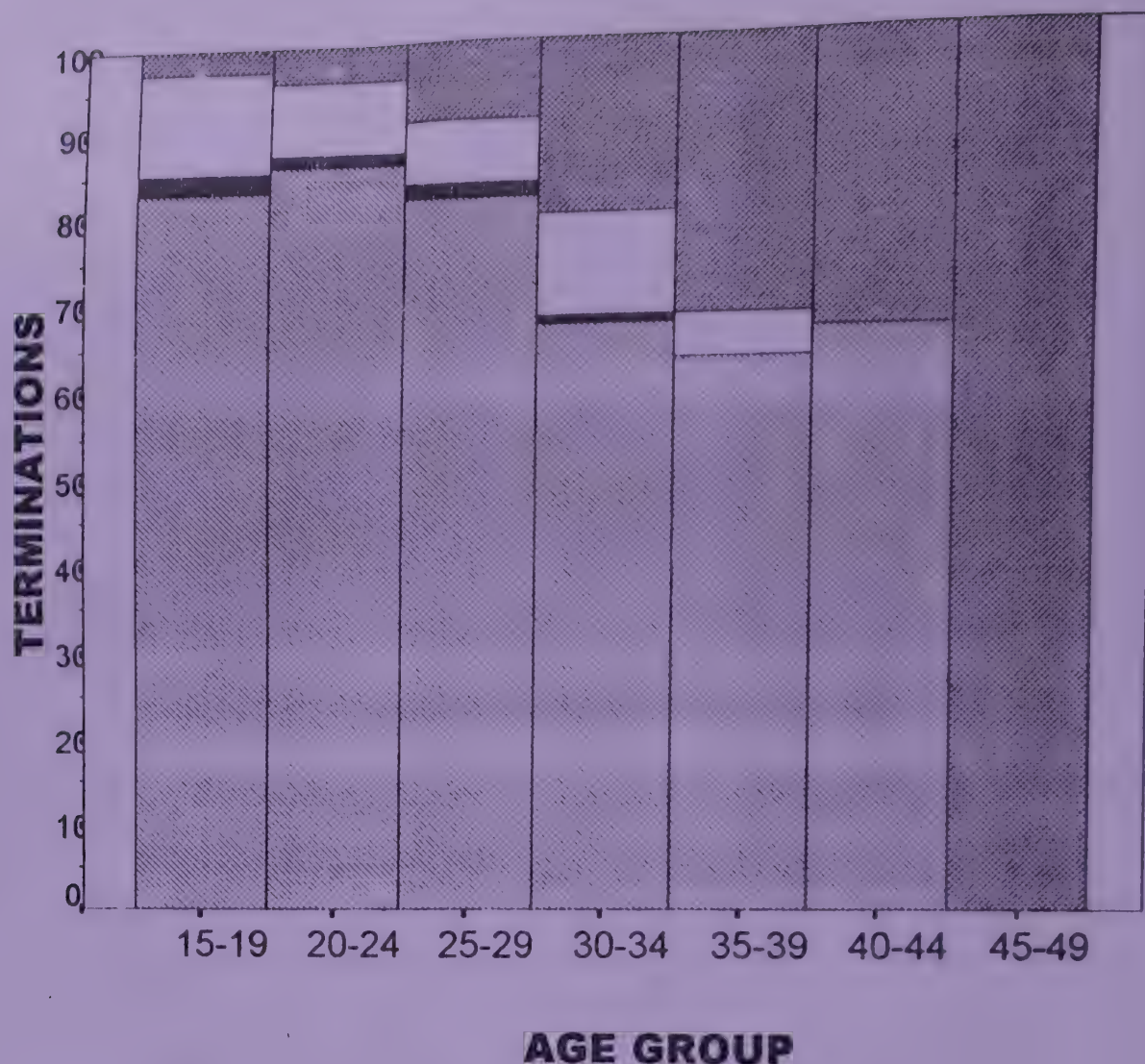


(c) Age-specific spontaneous abortion rate



(d) Age-specific induced abortion rate

Figure 6.3 Age-specific fertility rate (a), Age-specific stillbirth rate (b), Age-specific spontaneous abortion rate (c) and Age-specific induced abortion rate (d) computed using incidences during five years preceding the survey



LEGEND





-  Live births
-  Stillbirths
-  Spontaneous abortions
-  Induced abortions

Figure 6.4 Percent distribution of outcomes during five years preceding the survey by age of mother

6.4 Outcomes by Order of Conception

Table 6.6 shows the percent distribution of outcomes by order of conception among rural and urban women. The percent of induced abortions increases with rising order of outcome. Urban women start inducing pregnancies at lower order of pregnancies than the rural women. The percent of induced abortions out of all pregnancies reaches the level of about 18 percent among women with fifth pregnancy or above. This finding once again supports the observation made also by others that

induced abortions are being used as a method of contraception or as a back up to temporary methods of contraception. As induced abortion competes with spontaneous abortion, the proportion of spontaneous abortions moderately declines by order of pregnancy. About eight percent of first order pregnancies end in spontaneous abortions and it is only about six percent among fifth and higher order pregnancies.

Table 6.6 Percent distribution of pregnancy outcomes by order of conception according to place of residence

Order of conception	Number of outcomes	Live births	Still-births	Spontaneous abortions	Induced abortions
All	13109	85.5	2.3	7.1	5.0
Rural					
1	2824	89.1	3.1	7.7	0.4
2	2422	87.6	2.3	8.0	2.6
3	1624	86.0	2.3	6.7	5.6
4	878	83.5	2.8	5.2	9.2
5 & above	789	76.0	1.1	4.7	18.8
Urban					
1	1574	90.0	2.1	8.0	0.4
2	1344	86.4	2.1	7.7	4.4
3	862	84.1	1.7	6.0	9.2
4	431	77.7	2.6	6.0	14.6
5 & above	361	73.7	1.4	8.0	16.9
Total					
1	4398	89.4	2.7	7.8	0.4
2	3766	87.2	2.2	7.9	3.2
3	2486	85.3	2.1	6.4	6.8
4	1309	81.6	2.8	5.5	11.0
5 & above	1150	75.3	1.2	5.7	18.1

6.5 Gestational Period of Outcomes

Table 6.7 provides the outcomes by weeks of gestation in rural and urban areas. Among live births, about one percent are premature deliveries (gestation period of less than 37 weeks). Among stillbirths, 37 percent were of less than 37 weeks of gestation. As regards the gestation period for the spontaneous abortions, generally there is some underreporting of early terminations both in urban and rural areas. Underreporting of spontaneous abortions that took place within 12 weeks of gestation is more in rural areas than in urban areas. All induced abortions had a gestation period of less than 24 weeks. The first trimester induced abortions constitute 59 percent in rural and 61 percent in urban areas. Among rural women 75 percent of induced abortions are of gestation period 8-15 weeks, and this percent is 84 among urban women. If we consider a gestation period of over 16 weeks is late for inducing, the proportion of late induced abortions is 12 percent in rural and 6 percent in urban areas.

Table 6.7 Percent distribution of live births, stillbirths, spontaneous abortions and induced abortions occurred after 1996 to ever-married women by length of gestation (in weeks) and by place of residence

Length of gestation (weeks)	Live Births		Stillbirths		Spontaneous abortions		Induced abortions	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Rural								
4-7	0	0.0	0	0.0	1	0.6	15	12.9
8-11	0	0.0	0	0.0	25	14.8	53	45.7
12-15	0	0.0	0	0.0	94	55.6	34	29.3
16-19	0	0.0	0	0.0	32	18.9	12	10.3
20-23	0	0.0	0	0.0	15	8.9	2	1.7
24-27	0	0.0	0	0.0	2	1.2	0	0.0
28-31	0	0.0	4	14.3	0	0.0	0	0.0
32-35	13	0.9	4	14.3	0	0.0	0	0.0
36-39	1036	68.7	14	50.0	0	0.0	0	0.0
40 +	460	30.5	6	21.4	0	0.0	0	0.0
Total	1509	100.0	28	100.0	169	100.0	116	100.0
Urban								
4-7	0	0.0	0	0.0	0	0.0	8	9.8
8-11	0	0.0	0	0.0	21	22.3	42	51.2
12-15	0	0.0	0	0.0	48	51.1	27	32.9
16-19	0	0.0	0	0.0	19	20.2	5	6.1
20-23	0	0.0	0	0.0	4	4.3	0	0.0
24-27	0	0.0	0	0.0	1	1.1	0	0.0
28-31	6	0.7	5	23.8	1	1.1	0	0.0
32-35	8	1.0	5	23.8	0	0.0	0	0.0
36-39	536	66.0	5	23.8	0	0.0	0	0.0
40 +	274	33.9	6	28.6	0	0.0	0	0.0
Total	824	100.0	21	100.0	94	100.0	82	100.0
Total								
4-7	0	0.0	0	0.0	1	0.4	23	11.6
8-11	0	0.0	0	0.0	46	17.5	95	48.0
12-15	0	0.0	0	0.0	142	54.0	61	30.8
16-19	0	0.0	0	0.0	51	19.4	17	8.6
20-23	0	0.0	0	0.0	19	7.2	2	1.0
24-27	0	0.0	0	0.0	3	1.1	0	0.0
28-31	6	0.3	9	18.4	1	0.4	0	0.0
32-35	21	0.9	9	18.4	0	0.0	0	0.0
36-39	1572	67.4	19	38.8	0	0.0	0	0.0
40 +	774	33.2	12	24.5	0	0.0	0	0.0
Total	2333	100.0	49	100.0	263	100.0	198	100.0

6.6 Differentials in Pregnancy Outcomes

In what follows socio-cultural and economic correlates of pregnancy outcome are examined. The characteristics under consideration are place of residence, religion, caste, family type, education, occupation of woman and asset index. While presenting the average number of events to a category of a particular variable, standardization is done for all the other variables in addition to age of woman using Multiple Classification Analysis technique. Hence, we may interpret that the figures given are the net effect of a given variable while the effect of all other variables and age are controlled (or all other variables are at their means).

Table 6.8 presents pregnancy outcomes by categories of socio-cultural characteristics of ever-married women. As found everywhere the mean number of outcomes is larger among rural women (2.67) than among urban counterparts (2.59). The incidence of induced abortion is more in urban area (5.1 percent of total outcomes) than in the rural area (4.7 percent of total outcomes). Percentages of stillbirths and spontaneous abortions are also marginally higher in urban area. The average number of outcomes is larger among Muslim women (3.01) than other religions (Hindus, 2.48 and Christians, 2.40). While the percent of spontaneous abortion is more among Muslim women, the percent of induced abortion is more among Hindu women. Ignoring the case of Scheduled Tribe, as the number of observations is small, we notice that Scheduled caste women, on an average, have larger number of outcomes (2.90) than 'others' (2.55). Scheduled Caste women also have larger number of live births and spontaneous abortions compared to 'others'. Women in the nuclear families have larger mean number of outcomes (2.77) than those in non-nuclear families (2.49) even after controlling for age and other background characteristics. Also mean number of live births is higher among women in nuclear families (2.37) than those in non-nuclear families (2.12). While the percent of spontaneous abortion is lower among nuclear family women, the percent of induced abortion is higher among them compared to others.

There is a negative relationship between the level of education of mother and the number of pregnancy outcomes. Illiterates, on an average, have 2.78 pregnancy outcomes; among primary school completed it is 2.75, among those completed middle school 2.65 and women who completed high school and above have 2.34. The mean number of live births also declines with rising level of education. The percentages of live births and stillbirths also decrease with rising educational level of women. The percent of pregnancies ending in spontaneous abortion is found to increase with increasing level of education up to middle school completion from 5.6 to 8.1 and then declines to 7.4 to women who completed high school. It is hard to believe such an association. This can be explained only by poor reporting of spontaneous abortions by less educated than the better educated. On the other hand, the percentage of induced abortions increases with increasing level of education. The percent of induced abortions among total outcomes increases from 3.1 percent among illiterates to 6.7 percent among those completed high school.

Table 6.8 Standardized mean number of various pregnancy outcomes by socio-cultural characteristics of ever-married women*

Characteristics	No. of women	Average number of					Percent of pregnancies resulting in			
		Out-come	LB	SB	SA	IA	LB	SB	SA	IA
All	4814	2.63	2.25	0.07	0.19	0.13	85.5	2.5	7.0	4.9
Place of residence										
Rural	3086	2.67	2.29	0.07	0.19	0.13	85.9	2.4	7.0	4.7
Urban	1728	2.59	2.20	0.07	0.19	0.13	85.0	2.6	7.2	5.1
Religion										
Hindu	4156	2.48	2.10	0.07	0.16	0.15	84.4	3.0	6.6	6.0
Muslim	376	3.01	2.59	0.05	0.22	0.14	86.2	1.7	7.4	4.8
Christian	282	2.40	2.05	0.08	0.17	0.10	85.7	3.2	7.1	4.0
Caste										
SC	1063	2.90	2.46	0.05	0.25	0.14	84.8	1.9	8.7	4.7
ST	53	2.90	2.54	0.13	0.06	0.17	87.7	4.6	2.0	5.8
Not stated/refused	75	2.58	2.23	0.07	0.14	0.15	86.4	2.6	5.2	5.7
Others	3623	2.55	2.18	0.07	0.17	0.13	85.6	2.7	6.6	5.0
Family Type										
Nuclear	3138	2.77	2.37	0.06	0.19	0.15	85.6	2.3	6.7	5.4
Non-nuclear	1676	2.49	2.12	0.07	0.19	0.12	85.4	2.7	7.4	4.4
Education										
Illiterate	1591	2.78	2.44	0.10	0.16	0.09	87.9	3.4	5.6	3.1
Literate & < Pri. Sch. comp.	1614	2.75	2.35	0.08	0.20	0.13	85.2	2.7	7.2	4.8
Middle complete	672	2.65	2.24	0.05	0.21	0.14	84.5	2.0	8.1	5.4
High Sch. comp.& above	937	2.34	1.96	0.04	0.17	0.16	84.0	1.8	7.4	6.7

* Standardized for all other variables in the tables 6.8 and 6.9 and age of woman

Table 6.9 presents pregnancy outcomes by categories of economic characteristics of ever-married women. Ignoring the industrial workers who are too small in number, we find women employed as professionals (2.44), non-agricultural labourers (2.48) and home-makers (2.58) have lower mean number of outcomes than the rest. Women in professional services not only have smaller number of pregnancies but also induce larger percentage of their pregnancies, thus ending with a low average number of live births. Non-working women (home-makers) and those working as agricultural labourers constitute about 70 percent of all women. Those who work in the farm for wages have an average of 2.63 pregnancy outcomes, only 0.05 outcomes more than the non-working women.

The table 6.9 also provides pregnancy outcomes to ever-married women by their economic status. Mean number of outcomes and mean number of live births do not differ between low and medium asset groups. But the high asset index group has lower number of live births and stillbirths compared to others. Percentage of spontaneous abortions declines with rising asset level and the percentage of induced abortions increase with increasing asset level.

Table 6.9 Standardized mean number of various pregnancy outcomes by economic characteristics of ever-married women*

Characteristics	No. of women	Average number of					Percent of pregnancies resulting in			
		Out-come	LB	SB	SA	IA	LB	SB	SA	IA
All	4814	2.63	2.25	0.07	0.19	0.13	85.5	2.5	7.0	4.9
Occupation										
Owner cultivator	521	2.67	2.31	0.07	0.17	0.13	86.4	2.6	6.2	4.8
Labourers (Agri)	1035	2.63	2.26	0.07	0.17	0.14	85.8	2.5	6.5	5.1
Labourers (Non-agri)	410	2.48	2.22	0.06	0.11	0.09	89.5	2.3	4.6	3.7
Business & trade	133	2.89	2.58	0.09	0.12	0.11	89.0	3.3	4.1	3.6
Professional	162	2.44	2.04	0.06	0.16	0.17	83.6	2.5	6.7	7.1
Industrial worker	49	2.40	1.91	0.11	0.23	0.15	79.8	4.5	9.5	6.3
Modern skilled services	175	2.68	2.26	0.07	0.23	0.12	84.3	2.6	8.5	4.6
Others	55	2.89	2.43	0.01	0.30	0.15	84.0	0.5	10.3	5.3
Home maker	2274	2.58	2.22	0.07	0.18	0.11	86.3	2.6	7.0	4.2
Asset index										
Low	1441	2.64	2.27	0.07	0.21	0.09	85.7	2.8	7.9	3.5
Medium	1636	2.65	2.27	0.07	0.18	0.14	85.5	2.6	6.6	5.2
High	1737	2.59	2.21	0.06	0.17	0.16	85.1	2.2	6.5	6.1

* Standardized for all other variables in the tables 6.8 and 6.9 and age of woman

6.7 Repeat Abortions and Association between Successive Outcomes

There is association between successive outcomes. Table 6.10 and Figure 6.5 are drawn to identify the association between successive outcomes. If the first pregnancy is a live birth, the chances for the second pregnancy is also a live birth is 89 percent and the chances of ending in a stillbirth or spontaneous abortion is 7.5 percent. About 22 percent of the second pregnancies end in stillbirth or spontaneous abortion if the first outcome is a stillbirth. About 30 percent of the second outcomes are spontaneous abortions if the first outcomes are spontaneous abortions. A similar association is found between second and third pregnancy outcomes, between third and fourth outcomes and so on. These findings suggest that some women are prone to spontaneous abortions and/or stillbirths.

As regards induced abortion, the chance of successive pregnancies ending in induced abortion increases with increasing order of birth. While 11 percent of all fourth pregnancies are induced abortions, among those women who aborted third pregnancy this percent is 31. This is indicative of women using induced abortion as a terminal method of contraception. This is also supported by the fact that the higher proportion of higher order pregnancies ending in induced abortion if the previous one is a live birth.

Table 6.10 Percent distribution of $(i+1)^{\text{th}}$ outcome by nature of outcome according to the nature of i^{th} outcome

Order of outcome	Second									
	Live birth		Stillbirth		SA		IA		Total	
First	#	%	#	%	#	%	#	%	#	%
Live birth	2959	88.9	59	1.8	191	5.7	121	3.6	3330	100.0
Stillbirth	90	78.3	14	12.2	11	9.6	--	--	115	100.0
SA	207	67.2	9	2.9	92	29.9	--	--	308	100.0
IA	10	76.9	--	--	2	15.4	1	7.7	13	100.0
Total	3266	86.7	82	2.2	296	7.9	122	3.2	3766	100.0
Second	Third									
Live birth	1794	86.3	33	1.6	99	4.8	154	7.4	2080	100.0
Stillbirth	53	71.6	15	20.3	5	6.8	1	1.4	74	100.0
SA	188	75.5	3	1.2	54	21.7	4	1.6	249	100.0
IA	70	84.3	--	--	2	2.4	11	13.3	83	100.0
Total	2105	84.7	51	2.1	160	6.4	170	6.8	2486	100.0
Third	Fourth									
Live birth	902	83.6	19	1.8	41	3.8	117	10.8	1079	100.0
Stillbirth	27	67.5	10	25.0	2	5.0	1	2.5	40	100.0
SA	83	71.6	3	2.6	27	23.3	3	2.6	116	100.0
IA	46	62.2	3	4.1	2	2.7	23	31.1	74	100.0
Total	1058	80.8	35	2.7	72	5.5	144	11.0	1309	100.0
Fourth and above	Fifth and above									
Live birth	701	82.8	7	0.8	19	2.2	120	14.2	847	100.0
Stillbirth	28	75.7	5	13.5	3	8.1	1	2.7	37	100.0
SA	73	79.3	1	1.1	12	13.0	6	6.5	92	100.0
IA	59	40.7	1	0.7	4	2.8	81	55.9	145	100.0
Total	861	76.8	14	1.2	38	3.4	208	18.6	1121	100.0
i^{th}	$(i+1)^{\text{th}}$									
Live birth	6356	86.6	118	1.6	350	4.8	512	7.0	7336	100.0
Stillbirth	198	74.4	44	16.5	21	7.9	3	1.1	266	100.0
SA	551	72.0	16	2.1	185	24.2	13	1.7	765	100.0
IA	185	58.7	4	1.3	10	3.2	116	36.8	315	100.0
Total	7290	84.0	182	2.1	566	6.5	644	7.4	8682	100.0

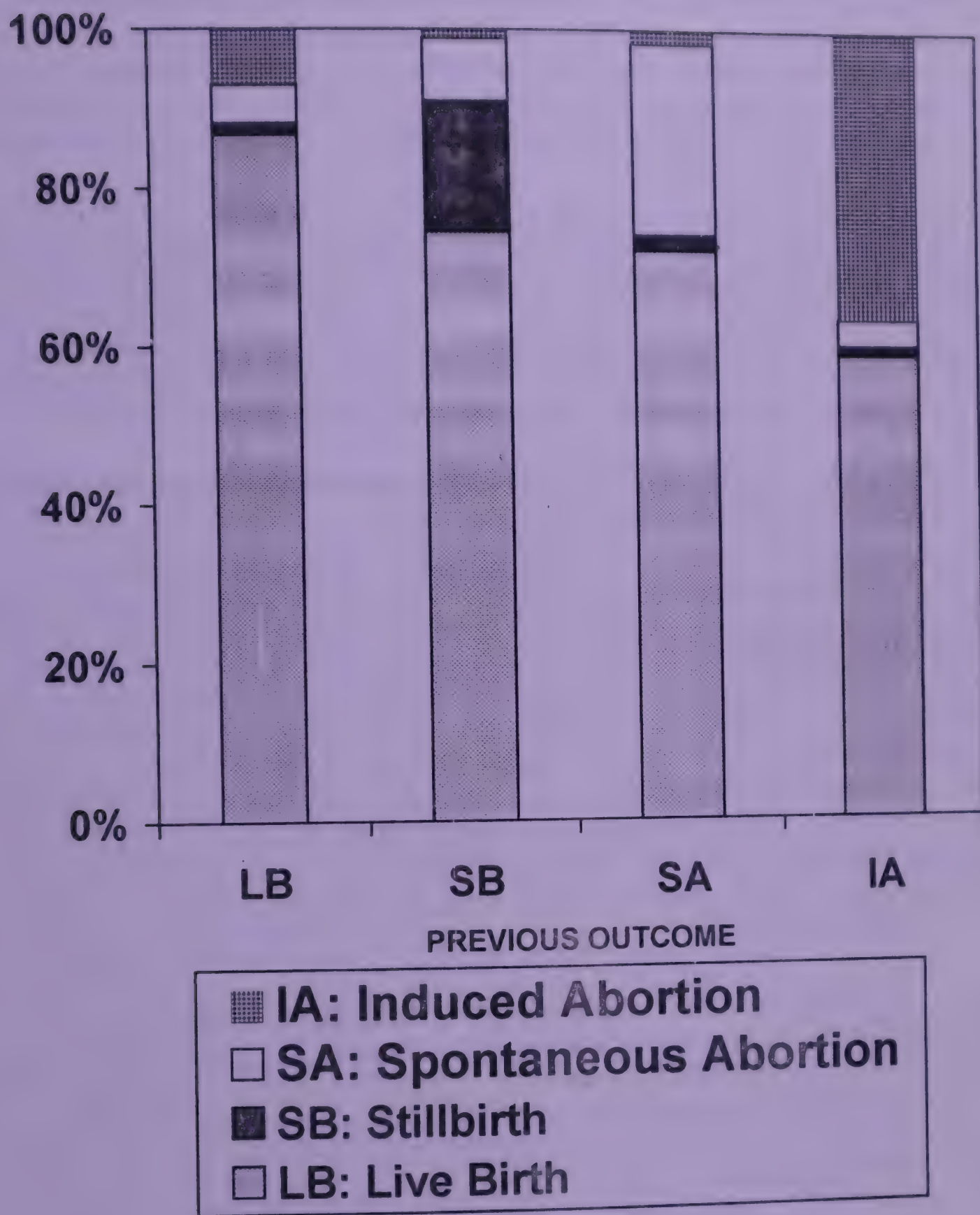


Figure 6.5 Percent distribution of outcomes by previous outcomes

It is clear from the foregoing that there are some women who repeatedly resort to induced abortions. In order to identify their characteristics, the following exercise is carried out. Repeated abortions imply at least two abortions. To have two abortions a woman should have had at least two outcomes. Hence women with at least two pregnancy outcomes are first selected. They are then divided into two groups, those with two or more abortions and those with less than two abortions. Those with two or more abortions are considered to have had repeated abortions. As the number of women with repeat abortions are only 101 in the sample, large number of independent variables could not be introduced in the multivariate analysis. Place of residence, religion, caste, education of woman and asset index are the only independent variables introduced in the analysis. As the dependent variable is a dichotomy, logistic regression is used and the results are given in Table 6.11.

It is found that the chances of repeated abortions increase with increasing number of living children. Women with large number of living children may have greater motivation to go in for induced abortions. Except woman's education all other socio-economic characteristics do not have any significant effect on repeat abortions. Woman's education has significant effect on repeat abortions. The proportion of women with repeat abortions is higher among better educated than among illiterates.

Table 6.11 Logistic regression of repeat abortions on socio-economic characteristics of ever-married women

Characteristics	Regression coefficient (B)	d.f.	Level of significance	Exp (B)
Place of residence				
Rural (Ref.)				
Urban	-0.156	1	0.495	0.855
Religion				
Hindu (Ref.)		2	0.329	
Muslim	-0.497	1	0.267	0.608
Christian	-0.512	1	0.281	0.599
Caste				
Non-SC/ST (Ref.)				
SC/ST	0.014	1	0.955	1.015
Education				
Illiterate (Ref.)		3	0.012	
Literate & < Pri. Sch. comp.	0.544	1	0.042	1.722
Middle complete	0.171	1	0.664	1.187
High Sch. comp.& above	1.013	1	0.002	2.753
Asset Index				
Low (Ref.)		2	0.436	
Medium	0.068	1	0.810	1.070
High	0.350	1	0.248	1.419
Number of living children				
	0.267	1	0.002	1.307

6.8 Estimates of Underreporting of Spontaneous and Induced Abortions

Many women do not realize that they are pregnant during early weeks of gestation. When such early pregnancies end in spontaneous abortions, they are perceived as delayed menstruation and hence are not reported as spontaneous abortions. However, under the assumption that all pregnancies of gestation period of at least eight weeks are recognizable, we can attempt to estimate the level of underreporting of spontaneous abortions by applying a general pattern observed elsewhere. Such an attempt is made in Appendix G and it is estimated that there is an underreporting of approximately 27 percent in spontaneous abortions.

The appendix also tries to estimate sex selective induced abortions to check whether there is any underreporting of sex selective abortions. It is found that the incidence of sex selective abortion is too low to be ascertained even by the present sample size of 4814 ever-married women in this survey. It may, therefore, be concluded that the incidence of sex selective abortions is insignificant and hence underreporting of induced abortions due to sex selection is treated to be close to zero.

6.9 Adjusted Rates and Percentages of Outcomes

Earlier we observed that the percent distribution of various outcomes during the period 1997-till the date of survey. Out of 2843 outcomes during 1997-till the date of survey, 82.1 percent are live births, 1.7 are stillbirths, 9.3 are spontaneous abortions and 7.0 are induced abortions. We noticed underreporting only in spontaneous abortions and not in sex selective induced abortions. The observed 263 spontaneous abortions are 27 percent less than the estimated. Hence adjustment for under-enumeration gives 360 spontaneous abortions. Therefore, the total outcomes are to be 2940. After adjustment for underreporting of spontaneous abortions, the probability that a pregnancy with gestation period of 8 weeks resulting in a spontaneous abortion works out 0.12. This is close to the estimate of about 0.15 obtained by Muthiah (1990) in 34 villages in Madurai and Coimbatore districts using data gathered from six-weekly visits to women during 1971-75 and applying life table analysis.

After adjustment for under-enumeration of spontaneous abortions the percent of live births is 79.4, percent of stillbirths is 1.7, percent of spontaneous abortions is 12.2 and the percent of induced abortion is 6.7. Accordingly, the percent of pregnancies not ending in live births is 20.6. After adjustment for underreporting of spontaneous abortions the expected number of outcomes per woman at the end of reproduction is 2.54, out of which 1.92 are live births, 0.04 are stillbirths, 0.39 are spontaneous abortions and 0.18 are induced abortions.

For the projected population of 64 millions in the year 2004, assuming the crude birth rate of 18.2 observed in our survey, the estimates of the pregnancy outcomes are 1,170,000 live births, 25,000 stillbirths, 181,000 spontaneous abortions and 99,000 induced abortions per year.

6.10 Estimate of Unregistered Induced Abortions

The population of Tamil Nadu as on October 1, 1997 is estimated using 1991 and 2001 Census population totals and the exponential growth rate of 0.0106 to be 59,896,000. Assuming the average crude birth rate of 19.1 for the years 1997 and 1998 from the Sample Registration System, the estimate of live births during the financial year 1997-98 is 1,144,000. Applying the ratio of 8.487 induced abortions per 100 live births obtained from the survey, we get 97,000 induced abortions during 1997-98. The registered induced abortions are 47,620 (Family Welfare Programme in India Year Book). This suggests that 51 percent of the induced abortions are not registered.

CHAPTER 7

PLACE OF DELIVERY AND ATTENDANT

7.1 Trend in Place of Delivery and Attendant at Delivery

This chapter deals with place of delivery, attendant at the time of delivery and reasons for not going to institutions for delivery. Over a period of time home deliveries have given way to institutional deliveries (Table 7.1). The percent of home deliveries during 1998-2003 is 15, which is slightly less than what is observed in NFHS-2 and RCH. In rural area home deliveries constitute 20 percent and they constitute 5 percent in urban area. In the urban area there is a substantial increase in the utilization of private hospitals for delivery. On the other hand, there is a substantial increase in the utilization of both government and private hospitals among rural mothers for delivery. During 1998-2003 about 45 percent of deliveries took place in government hospitals both in rural and urban areas.

Even among the home deliveries, which are on the decline, the percent attended by ANM/Nurse/Midwife/LHV has been increasing over years both in rural and urban areas (Table 7.2). There is also a secular decline in the percentage of deliveries attended by trained birth attendants, as there is an increase in the utilization of services of better-qualified persons than just trained birth attendants.

Table 7.1 Percent distribution of births by place of delivery according to year of birth and place of residence

Years	Number of births	Percent of deliveries attended at			
		Home	Government institutions	Private institutions	Others
Rural					
1967-1982	1874	60.1	27.2	12.6	0.1
1983-1987	1505	50.8	34.8	14.4	0.1
1988-1992	1518	38.4	39.0	22.5	0.1
1993-1997	1370	29.9	43.4	26.6	0.1
1998-2003	1274	20.3	44.7	34.9	0.1
Total	7541	41.7	37.0	21.3	0.1
Urban					
1967-1982	1035	27.2	52.5	20.3	0.0
1983-1987	851	18.3	48.5	32.9	0.2
1988-1992	714	11.2	50.0	38.8	0.0
1993-1997	666	6.9	48.5	44.6	0.0
1998-2003	702	5.4	46.4	48.1	0.0
Total	3968	15.2	49.4	35.3	0.1
Total					
1967-1982	2909	48.4	36.2	15.3	0.1
1983-1987	2356	39.0	39.8	21.1	0.1
1988-1992	2232	29.7	42.5	27.7	0.0
1993-1997	2036	22.3	45.1	32.5	0.0
1998-2003	1976	15.0	45.3	39.6	0.1
Total	11509	32.5	41.3	26.1	0.1

Table 7.2 Percent distribution of births by attendant at delivery for home deliveries according to year of birth and place of residence

Years	Number of deliveries	Percent of deliveries attended by			
		Doctor	ANM/Nurse/ Midwife/ LHV	Dai (TBA)	Others
Rural					
1967-1982	1127	1.4	9.3	79.1	10.1
1983-1987	764	1.3	13.9	72.5	12.3
1988-1992	583	1.9	14.9	72.0	11.1
1993-1997	409	2.2	18.1	69.2	10.5
1998-2003	259	0.4	25.1	65.3	9.3
Total	3142	1.5	13.9	73.8	10.8
Urban					
1967-1982	282	2.1	25.9	65.6	6.4
1983-1987	156	0.6	26.9	66.0	6.4
1988-1992	80	1.3	38.8	50.0	10.0
1993-1997	46	6.5	37.0	50.0	6.5
1998-2003	38	2.6	36.8	31.6	28.9
Total	602	2.0	29.4	60.3	8.3
Total					
1967-1982	1409	1.6	12.6	76.4	9.4
1983-1987	920	1.2	16.1	71.4	11.3
1988-1992	663	1.8	17.8	69.4	11.0
1993-1997	455	2.6	20.0	67.3	10.1
1998-2003	297	0.7	26.6	60.9	11.8
Total	3744	1.6	16.4	71.6	10.4

7.2 Birth Order and Place of Delivery

Percent distribution of births by place of delivery and by birth order is given in Table 7.3. As the birth order increases percent of home deliveries increases both in rural and urban areas. Institutional deliveries, both government and private, decline as birth order increases. Usually for the first delivery a woman goes to her parental home. People at her home and her parental home take extra care for the safe delivery. Further, woman's parents provide the best care possible to avoid remarks from her husband's family members. These could be the reasons for higher proportion of institutional deliveries among the first births. Safe first delivery may prompt women to opt for home deliveries for subsequent deliveries to minimize cost of delivery and hence resort to home delivery.

Table 7.3 Percent distribution of births by place of delivery according to birth order and place of residence

Birth order	Number of deliveries	Percent of deliveries at			
		Home	Govt. institutions	Private institutions	Other places
Rural					
1	2870	32.2	40.5	27.3	0.1
2	2343	41.7	37.0	21.2	0.1
3	1330	48.3	35.6	16.0	0.0
4+	998	60.1	28.8	11.1	0.0
Total	7541	41.7	37.0	21.3	0.1
Urban					
1	1589	12.2	45.3	42.5	0.1
2	1281	15.6	48.7	35.6	0.1
3	667	17.2	56.2	26.5	0.0
4+	431	21.6	56.6	21.8	0.0
Total	3968	15.2	49.4	35.3	0.1
Total					
1	4459	25.1	42.2	32.7	0.1
2	3624	32.5	41.2	26.3	0.1
3	1997	38.0	42.5	19.5	0.0
4+	1429	48.5	37.2	14.3	0.0
Total	11509	32.5	41.3	26.1	0.1

7.3 Reasons for Choosing Home Delivery

Table 7.4 presents reasons for not going to hospitals as stated by respondents when they had home deliveries. For little more than one-fourth among those, who had home deliveries in rural and urban areas, the reason for not going to the hospital is that they get good care at home. One-fifth of the rural women who had home deliveries reported that no need was felt to go to hospital for delivery and the comparative percentage is 14 among urban women. Another important reason for not going to hospitals is 'no time', which means that the labour pain started and that there was no time to go to hospital. This reason is stated by 21 percent of urban and 14 percent of rural women who had home deliveries. Generally, the hospital is away from rural area and frequency of public transport service is also low in rural areas. Hence one may understand 'no time' as one of the frequently stated reasons for rural women. But we observe that the percentage giving this reason is more among urban women. This requires detailed investigation.

Table 7.4 Reasons stated by women for not going to hospital for births that took place at home by place of residence

Reasons	Place of residence					
	Rural		Urban		Total	
	Number	Percent	Number	Percent	Number	Percent
Good care at home	827	26.3	165	27.4	992	26.5
No need was felt	608	19.4	84	14.0	692	18.5
Not customary	457	14.5	105	17.4	562	15.0
No time	430	13.7	124	20.6	554	14.8
Very expensive	457	14.5	70	11.6	527	14.1
Very far	218	6.9	22	3.7	240	6.4
Family did not permit	50	1.6	6	1.0	56	1.5
VHN was nearby	33	1.1	11	1.8	44	1.2
Not much information about hospital	31	1.0	1	0.2	32	0.9
Accidentally happened	16	0.5	5	0.8	21	0.6
Health care is not good	12	0.4	1	0.2	13	0.3
Not willing to say	1	0.0	0	0.0	1	0.0
Others	2	0.1	8	1.3	10	0.4
Total	3142	100.0	602	100.0	3744	100.0

CHAPTER 8

SPONTANEOUS ABORTIONS: REASON, POST-ABORTION SERVICE, COST AND SUPPORT

In this chapter cause for spontaneous abortion as reported by women, post-abortion service providers, cost (direct and wage loss both to women and members of the family) and care are discussed. The nature of treatment received from the provider, mode of onward travel and return, time to reach the provider's place, duration of stay at the place of provider, expenditure on post-abortion treatment, source of funding for the expenditure, whether the woman had rest after abortion, persons who helped in household chores and taking care of children below 10 years of age are also discussed.

8.1 Perceived Reason

The number of spontaneous abortions encountered in the period after 1996 till the date of survey in the sample is 263. Table 8.1 lists the reasons for spontaneous abortion as reported by women. Since information gathered is retrospective in nature, it is possible that some of those who went to a doctor for post-abortion service may report the reason as informed by the doctors to the women. Women who have never been to a doctor for post-abortion medical care may report reasons as perceived by them. Hence the causes reported by women have to be interpreted in this light. More than two-fifths of women are not able to give any reason for the incidence. For thirteen percent of spontaneous abortions strain of work is the cause for abortion. 'Frequent travel' and 'falling down' are the causes for another 7 percent of the cases. In nine percent of the cases women report that it occurs frequently and hence no reason can be attributed. In eight percent of the cases women report uterus weakness as the possible cause for the event and for another six percent the cause is general weakness. In three percent of the cases the cause is consumption of 'hot food' (like papaya). Traditional Indian system of medicine classifies food into 'Hot' and 'Cold' (Hasan, 1967). Reddy (1990) also finds that people consider 'hot food' to cause spontaneous abortions. For 5 cases the cause is

reported as medicine orally consumed for other ailments and for one case the cause is blood group incompatibility. Even today some women seem to believe in super natural elements playing a role in causing spontaneous abortion. In seven percent of the cases women believe spontaneous abortions to them were caused by devils and demons.

Table 8.1 Reasons for the occurrence of spontaneous abortions as stated by respondents

Reasons	Number	Percent
Don't know	110	41.8
Strain of work	33	12.5
Frequent occurrence	24	9.1
Uterus weakness	21	8.0
Foul play of devils and demons	18	6.8
General weakness	15	5.7
Frequent travel	12	4.6
Ate papaya/ hot food	8	3.0
Fell down	6	2.3
Early age pregnancy	5	1.9
Effect of drugs taken for other reasons	5	1.9
Due to shock/ fear	3	1.1
Old age pregnancy	1	0.4
Blood group incompatibility	1	0.4
Mental illness	1	0.4
Total	263	100.0

8.2 Post-Abortion Medical Care

Table 8.2 provides data on service providers and the kind of treatment given by them. Twenty four percent of the cases did not take any treatment after spontaneous abortion. More than three-fifths of the women approached private health care providers and 11 percent went to government health care providers. Only 3 percent relied on self-treatment and just 2 women on untrained health care provider. About 47 percent of women underwent Dilatation and Curettage and another 21 percent were administered injection and tablets/drips.

Comparatively, private health care providers (68 percent) had done Dilatation and Curettage after spontaneous abortion for more cases than the government health care providers (47 percent). All the 4 women who had scanning did so on the recommendation of private health care providers. Herbal juice/jaggary were the medication for those depended on self-medication or on untrained health care provider.

Table 8.2 Service provider and kind of treatment immediately following spontaneous abortions

Kind of treatment	Service provider											
	No treatment sought		Self treatment		Untrained health care Provider		Govt. health care Provider		Private health care Provider		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Not applicable	63	100.0	--	--	--	--	--	--	--	--	63	24.0
Checkup and/or oral drugs	--	--	--	--	1	50.0	5	16.7	3	1.9	9	3.4
Injection and tablets/drips	--	--	--	--	--	--	11	36.7	44	27.3	55	20.9
Scan	--	--	--	--	--	--	--	--	4	2.5	4	1.5
D & C	--	--	--	--	--	--	14	46.7	110	68.3	124	47.1
Herbal juice/jaggary	--	--	7	100.0	1	50.0	--	--	--	--	8	3.0
Total	63	24.0	7	2.7	2	0.8	30	11.4	161	61.2	263	100.0

8.3 Cost

Mode of travel used by the respondents to go to the service providers for treatment and return is presented in Table 8.3. In 27 percent of spontaneous abortions, women did not seek any treatment from providers. Very few of these women depended on self-treatment. About 45 percent of women traveled by bus to go to and return from the service provider. Only 14 percent of women used auto-rickshaws to go to the service provider and for return. Another 6 percent of women went by car and 8 percent returned by car after post-abortion treatment from the service provider. Cross-classification reveals that, by and large, the same mode of transportation is used for both directions (table not shown).

Table 8.3 Mode of travel used by respondents to go to service provider for treatment and return

Mode of travel	Going		Returning	
	Number	Percent	Number	Percent
No treatment sought and self-treatment	71	27.0	71	27.0
Bus	118	44.9	113	43.0
Auto-rickshaw	37	14.1	38	14.4
Car	15	5.7	22	8.4
Walk	14	5.3	13	4.9
Van	4	1.5	3	1.1
Two wheeler	3	1.1	2	0.8
Bi-cycle	1	0.4	1	0.4
Total	263	100.0	263	100.0



Table 8.4 provides mean time taken to reach the place of service provider and mean distance in kilometers by mode of travel. The average time taken to reach the service provider for post-abortion treatment by those who sought treatment from others is 36 minutes (median = 30 minutes). The average distance traveled is 12.9 kilometers (median = 8.0 kilometers). Short distances are managed by motored two-wheeler, bicycle and walk or by hiring three wheelers. If the distance is long, bus, car or van is used. About five percent of the women had to walk an average distance of 1.3 km to reach the provider, which takes about 25 minutes. By looking at the distance and the mode of travel we find long distance travels are made by bus, car or van, the most common being the bus. Car or van is seldom used. In spite of post-abortion tiredness and complications women had to under go the ordeal of walking to the bus stop, traveling long distance by bus and again walking to the place of service provider.

Table 8.4 Mean time taken (in minutes) to reach the place of service provider and distance in kilometers

Mode of travel to go to the provider	Number	Mean time taken to reach the provider (in minutes)	Mean distance in kilometers
Van	4	40	22.0
Car	15	35	17.9
Bus	118	44	16.7
Auto-rickshaw	37	19	3.3
Bi-cycle	1	15	2.0
Two wheeler	3	18	1.7
Walk	14	25	1.3
No treatment sought and self treatment	71	NA	NA
Total	192	36 (Median = 30)	12.9 (Median = 8.0)

Table 8.5 provides the mean duration of stay (in hours) at the provider's place for treatment after spontaneous abortion. The average time of stay at service provider's place for post-abortion treatment is 23 hours, nearly a day. Since a large proportion of women stayed at providers' place less than a day, the median duration of stay is only 12 hours. More than one-fourth (26 percent) of women stayed for two days, which is 24-47 hours. Twenty-one percent of women stayed less than three hours, 19 percent stayed 3-5 hours and 16 percent stayed nearly one day for post-abortion treatment. About 17 percent of women stayed between 2 and 9 days for the post-abortion treatment.

Table 8.5 Duration of stay (in hours) at the provider's place for treatment after spontaneous abortion

Duration of stay (hours)	Number	Percent
< 3 hours	41	21.4
3 – 5 hours	37	19.3
6 – 11 hours	13	6.8
12 – 23 hours	18	9.4
24 – 47 hours	50	26.0
2 days to 9 days	33	17.2
Total	192	100.0
Mean	23.0	
Median	12.0	

Women who had spontaneous abortion are distributed by cost incurred by them for post-abortion treatment (Table 8.6). This includes service cost, travel, accommodation, medicine and food outside home. The average expenditure was Rs.1,134 and the median expenditure was Rs. 600. More than one-fourth (26.6) of the cases did not take any treatment after spontaneous abortion, so there was no cost for them. Twenty-two percent of the cases spent Rs. 600-1,200 for post-abortion treatment. In the case of 14 percent of women the expenditure was Rs. 2,200 or more for the post-abortion medical care.

Table 8.6 Expenditure on post-spontaneous abortion treatment

Expenditure (in rupees)	Number	Percent
No expenditure	70	26.6
Rs. < 200	16	6.1
Rs. 200 – 599	40	15.2
Rs. 600 – 1199	57	21.7
Rs. 1200 – 2199	43	16.3
Rs. 2200 and above	37	14.1
Total	263	100.0
Mean	Rs.1134	
Median	Rs.600	

Source of funding for expenses on post-abortion treatment along with the average cost is presented in Table 8.7. Out of 263 cases, 35 percent of women managed the expenses of an average of about Rs.1,230 as part of routine household expenditure. For 13 percent of women the entire expenditure (average of Rs. 1,682) was borne by their parents. Eleven percent of women borrowed (an average of Rs. 2,192) from their parents or other relatives. Overall, 21 percent of women had to borrow. The sources for raising loan are parents, relatives, moneylenders and employers.

Table 8.7 Source of funding for expenses (direct cost) on treatment

Expenses	Number	Percent	Average expenditure (Rs.)
Out of household expense	91	34.6	1227
Taken from woman's parents	35	13.3	1682
Borrowed from parents/relatives	29	11.0	2192
Money lenders	21	8.0	1741
Other relatives	8	3.0	947
Savings	5	1.9	2238
Loan from employer	4	1.5	2184
No expenditure	70	26.6	0
Total	263	100.0	1134

Indirect cost due to spontaneous abortion in terms of wage foregone by women and others in the family is presented in Table 8.8. On the average, more than a week's (8.43 days) wage of woman who had spontaneous abortion is lost. Another two days of wage is lost to other members in the family. The total family wage loss is Rs. 287 per spontaneous abortion; mother's wage loss is Rs. 211 and of others' in the family Rs.76.

Table 8.8 Days of work lost and indirect cost (loss of wage to the respondent and others in the family) due to spontaneous abortion

Source	Average
Number of days the woman did not go for work	8.43
Woman's wage loss in rupees	211
Number of days others in the family did not go for work	1.82
Wage loss for others in the family in rupees	76
Total family wage loss in rupees	287
Median wage loss	0.0

Note: Number of respondents is 263.

Average total cost, both direct and indirect, per spontaneous abortion is Rs.1,421, out of which 80 percent is direct cost and the median cost is Rs. 900.

8.4 Family Support

About 38 percent of women went to their mother's place either soon after spontaneous abortion or even while pregnant (Table 8.9). They not only had some rest after spontaneous abortion but also would have had the opportunity of some psychological support from parents. A large majority (62 percent) did not have such an opportunity. It is also possible for some women to have rest within their own home. Hence women were asked as to whether they were freed from household chores soon after miscarriage. Sixty percent of women were totally freed and 17 percent were partly

freed from household chores. The rest one-fourth (24 percent) had no rest and they had to continue to do their household chores as they did before the miscarriage. While 24 percent had no rest, 26 percent had less than ten days of rest and the others had 10 or more days of rest.

Table 8.9 Number of days stayed at parent’s place or elsewhere for rest (in days) after abortion and freedom from household chores

<div> <div> Took rest after abortion </div> <div> Number </div> <div> Percent </div> </div>		
Number of days		
< 10 days	35	13.3
10 – 19 days	23	8.7
20 – 90 days	24	9.1
Went to parent’s place while pregnant	19	7.2
Not gone for parent’s place/elsewhere	162	61.6
Freed of household chores?		
Yes – completely	157	59.7
Somewhat	44	16.7
No	62	23.6
Number of days freed from household work		
Not taken rest	62	23.6
< 10 days	68	25.9
10 – 19 days	72	27.4
20 – 90 days	61	23.2
Total	263	100.0

Nearly one-fourth (24 percent) of the cases did not get any help in household chores from others. About 29 percent of women who had spontaneous abortion received help from women from husband’s side and another 29 percent from mother’s side (Table 8.10). To 7 percent of women help was extended by women from both parents’ and husbands’ sides. About 40 percent of those who had spontaneous abortion had no child below 10 years of age at the time of the event (Table 8.11). Among those who had a child under 10 years of age at the time of the event, 43 percent did not get help in child care from any one. Women from husband’s side extended help in childcare in 25 percent of the cases and women from mother’s side in another 26 percent of the cases.

Table 8.10 Person who helped the women during post-spontaneous abortion period in household chores

Relationship	Frequency	Percent
No help from anyone	62	23.6
Women from mother's side	77	29.3
Women from husband's side	76	28.9
Men from husband's side	18	6.8
Women from both side	18	6.8
Women and men from husband's side	2	0.8
Other female relatives	7	2.7
Friends	3	1.1
Total	263	100.0

Table 8.11 Help in caring children less than 10 years of age during post- spontaneous abortion period

Relationship	Frequency	Percent	Percent among those who have a child below 10 years of age
No child < 10 years old	103	39.2	NA
No help from anyone	68	25.9	42.5
Women from mother's side	41	15.6	25.6
Women from husband's side	40	15.2	25.0
Men from husband's side	8	3.0	5.0
Other female relatives	3	1.1	1.9
Total	263	100.0	

INDUCED ABORTIONS:
MOTIVE, DECISION, SERVICE PROVIDER,
COST AND CARE

9.1 Motive

There were 198 induced abortions to ever-married women of age 15-49 in the sample after 1996 till the date of survey. The reasons as reported by women who underwent induced abortions are given in Table 9.1. For a substantial percentage of women (42 percent) the reason is that the pregnancy was not wanted. They seem to use induced abortions as a method to avoid childbirth. Yet another 42 percent of women resorted to induced abortion, since according to them pregnancies were sooner than expected. Sundari Ravindran and Balasubramanian (2004) also find that women in Tamil Nadu resort to abortion largely to either limit or space births. These women have used induced abortion as a spacing method. These 84 percent of abortions could have been avoided if women had used effective spacing or limiting methods. Overall, 9 percent of abortions were carried on medical advice - 5 percent for reasons of poor development of embryo or possible birth defect and 4 percent for reasons of potential risk to mother's life. In 2.5 percent of the cases the reason was that members in the family did not want the baby. It is not, however, clear whether the family did not want the baby after knowing the sex of the foetus or not.

Table 9.1 Reasons for induced abortion as stated by respondents

Reasons	Number	Percent
Not wanting more children	83	41.9
Want to space children	83	41.9
Medical advice on account of poor growth / birth defect	10	5.1
Medical advice on account of risk to mother's life	8	4.0
Financial problems	6	3.0
Family did not want the baby	5	2.5
Family problems	2	1.0
Failure of contraception	1	0.5
Total	198	100.0

9.2 Decision-Making

In 95 percent of the situations husband knew about the induced abortion. In 45 percent of the situations woman's parents knew about it. In 16 percent of the cases parents-in-law knew about it. But when it comes to taking decision to abort, only about a half of the women take decision either by themselves or along with their husbands (Table 9.2). In another half of the cases, husband alone or along with woman's parents or along with woman's parents-in-law decide that the woman undergoes abortion.

Table 9.2 Persons who knew about the woman having induced abortion and persons involved in making decision to abort

Relationship	Frequency	Percent
Person who knew about the induced abortion		
No one else	1	0.5
Only husband	79	39.9
Husband & woman's parent's family	81	40.9
Husband & woman's parents-in-law	27	13.6
Woman's parents family	5	2.5
Woman's parents-in-law	2	1.0
Woman's parents-in-law & parent's family	3	1.5
Person involved in decision-making		
Only herself	8	4.0
Self & husband	87	43.9
Self & woman's parents-in-law	2	1.0
Husband	41	20.7
Husband & woman's parent's family	15	7.6
Husband & woman's parents-in-law	42	21.2
Mother	1	0.5
Woman's parents-in-law	2	1.0

9.3 Service Provider

Table 9.3 gives the service provider and the method adopted by them to abort pregnancy. Out of 198 induced abortions carried out, for one induced abortion the woman declined to report the source of service, the method used, and a few other details relating to the abortion. Among the rest, 80 percent resorted to private health care providers. There is no way of checking whether all these private health care providers are qualified and their clinics are well equipped to carry out induced abortions. Government health care institutions provided the service to 16 percent of induced abortions. That is government institutions carry out less than one-in-five abortions. About 3.5 percent of abortions were carried out clearly by quacks.

Table 9.3 Induced abortion service provider and method of inducing

Method of inducing	Service provider									
	Govt. health care Provider		Private health care Provider		Untrained health care Provider		Medical shop		Total	
	#	%	#	%	#	%	#	%	#	%
D&C	29	90.6	143	90.5	2	40.0	--	--	174	88.3
Injection and/or tablets	3	9.4	15	9.5	1	20.0	2	100.0	21	10.7
Insertion of foreign body	--	--	--	--	2	40.0	--	--	2	1.0
Total	32	100.0	158	100.0	5	100.0	2	100.0	197	100.0
Percent of induced abortions	16.2		80.2		2.5		1.0		100.0	

* One woman refused to name the service provider and the method used.

The method adopted to induce varied between providers. Private and government service providers by and large used D&C or injections and/or tablets. Both among government and private providers 90 percent use D&C. Even quacks perform D&C. They also continue to use crude traditional methods such as inserting sticks (branch of *Calotropis Giganpea* with latex, locally known as *Erukkalam*) into the uterus to abort pregnancies.

9.4 Cost

While for onward journey to the provider's place women prefer cheaper mode of travel, for return journey they prefer safer mode of travel (Table 9.4). This is because D&C is performed to many women and hence they need to travel by a comfortable mode on their return. While 65 percent went to the provider's place by bus, only 56 percent returned by bus. While 15 percent of women hired three-wheelers to go to the provider's place, 25 percent used the mode for their return journey. Use of car increased from 2 percent for onward journey to 8 percent for return journey.

Table 9.4 Mode of travel used by the respondent to go to service provider for induced abortion and return

Mode of travel	Going		Returning	
	Number	Percent	Number	Percent
Bus	128	65.0	110	55.8
Auto-rickshaw	30	15.2	49	24.9
Car	4	2.0	15	7.6
Walk	23	11.7	15	7.6
Two wheeler	8	4.1	6	3.0
Bi-cycle	2	1.0	1	0.5
Train	1	0.5	---	---
Doctor (at home) ⁺	1	0.5	1	0.5
Total	197	100.0	197	100.0

* One woman declined to answer.

⁺ Elder sister is a doctor and a family member.

On the average, a woman had to travel 36 minutes to cover an average distance of 12.8 km to reach the place of provider (Table 9.5). The median travel time is 30 minutes and the median distance is 6.0 kilometers. Bus, car or train was the mode of travel when the distance to be covered was long. Women traveled by three wheelers, two wheelers, and bicycles or by walk when the distance is short. Majority of the women used bus to cover an average distance of 18 km and the average time taken is 46 minutes.

Table 9.5 Time taken to reach the abortion service provider's place and distance in kilometers

Mode of onward travel	Number	Mean time taken to reach the place (in minutes)	Mean distance (in kilometers)
Bus	128	46	17.6
Auto-rickshaw	30	17	3.3
Walk	23	15	1.7
Two wheeler	8	15	3.6
Car	4	31	19.5
Bi-cycle	2	25	2.0
Train	1	60	20.0
Elder sister is a doctor (at home)	1	0	0.0
Total	197	36 (Median = 30)	12.8 (Median = 6.0)

* One woman declined to answer.

At the place of the provider 18 percent spent less than three hours to get the service (Table 9.6). Many among these would have received injection and prescription of tablets. As most of the women had D&C, they stayed for more than three hours. Thirty-seven percent of women stayed at the providers place for more than a day. Second trimester abortions and those followed by sterilization would have demanded more time of stay at the provider's place. The average duration of stay is 26 hours and the median is 12.0 hours.

Table 9.6 Duration of stay at the provider's place for induced abortion

Duration of stay (hours)	Number	Percent
< 3 hours	36	18.3
3 – 5 hours	38	19.3
6 – 11 hours	17	8.6
12 – 23 hours	32	16.2
24 – 47 hours	49	24.9
2 days to 11 days	25	12.7
Total	197	100.0
Mean	25.7	
Median	12.0	

• One woman declined to answer.

Overall, the average expenditure for an abortion is Rs.1,335 and the median expenditure is Rs. 950 (Table 9.7). This includes provider's fee, medicine, travel, food and accommodation outside home for the individual and the accompanying person(s). In 29 percent of the cases the expenditure was less than Rs. 600 and for 13 percent, the cost was Rs. 2,200 or more. For about 40 percent of the cases the expenditure ranged between Rs. 600 and Rs. 1, 200.

Table 9.7 Total (direct) cost (fee for provider, medicine, travel, food and accommodation) on induced abortion

Cost (in rupees)	Number	Percent
No expenditure	3	1.5
Rs. < 200	11	5.6
Rs. 200 – 599	43	21.8
Rs. 600 – 1199	76	38.6
Rs. 1200 – 2199	39	19.8
Rs. 2200 and above	25	12.7
Total	197	100.0
Mean	Rs. 1335	
Median	Rs. 950	

* One woman declined to answer.

In order to see whether the direct expenditure differs between public and private institutions, average cost is computed for services in public and private institutions and given in Table 9.8. The cost includes service cost, travel, medicine, food and accommodation. Only services provided by institutions are included in this analysis. It is found that there is a huge difference in the cost for services between public and private institutions. For D&C alone the average cost is Rs.1,337 for service in the private institutions, which is almost double as that in public institutions. When D&C is followed by sterilization the cost in private institutions escalates to an average of Rs. 3,561. Even in the case where only injections were done and tablets recommended the difference in cost is exorbitant. The average cost is only Rs. 485 in public institutions as against Rs. 1,857 in private institutions.

Table 9.8 Total direct cost (in rupees) per induced abortion by source and service

Method of inducing	Source of service			
	Public institutions		Private institutions	
	Number	Average cost	Number	Average cost
D&C	22	759	136	1337
D&C & sterilization	7	599	7	3561
Injections and Tablets only	3	485	15	1857
Any	32	698	158	1485

Source of funding for the expenses of induced abortion along with the average cost was presented in Table 9.9. In more than half (56 percent) of the cases, the expenditure was managed out of household expenses: the average for such cost was Rs. 1,064. Thirteen percent of women borrowed from their parents and their average expenditure was Rs.1,216. Another 13 percent, whose average expenditure was Rs. 1848, borrowed from both parents and relatives. About 9 percent borrowed money from moneylenders for their average expense of Rs.1,091. Two women borrowed from friends and the average cost of abortion was too high.

Table 9.9 Source of funding for expenses on induced abortion

Source of funding	Number	Percent	Average expenditure (Rs)
No expenditure	4	2.0	0
Savings	1	0.5	1000
Out of household expense	110	55.6	1064
Taken from woman's parents	26	13.1	1216
Other relatives	8	4.0	1129
Borrowed from parents/relatives	26	13.1	1848
Friends	2	1.0	11000
Money lenders	17	8.6	1091
Loan from employer	4	2.0	3941
Total	198	100.0	1328
Median	Rs.950		

In addition to direct cost, there are indirect costs involved in terms of wages foregone by the woman and her family members. On an average, a woman is not able to go for work for 12 days due to induced abortion (Table 9.10). This costs a woman an average of Rs. 244. Further, an average of two person-days of work of family members is lost and the average wage loss is Rs. 43. Together total indirect cost per abortion is Rs. 287. Both direct and indirect costs together per abortion are Rs. 1622 and the median is Rs. 1000.

Table 9.10 Days of work lost and indirect cost (loss of wage to the respondent and others in the family) due to induced abortion

Source	Average
Number of days the mother did not go for work	11.8
Mothers' wage lost in rupees	244
Number of days others in the family did not go for work	1.9
Wage lost for others in the family in rupees	43
Total family wage lost in Rs.	287
Median	0.0

* Total number of induced abortions is 198.

9.5 Care

Family Care

Generally women in this region go to parent's place for the first and even some subsequent deliveries. Women's parents also meet the expenses relating to delivery. During late pregnancy, delivery and few months after delivery women stay with parents and thus are relieved from household chores. Pregnant women receive lot of physical and emotional support from parents. Whether such support is received for induced abortions also is not known.

As regards rest after induced abortion, women were asked about the place they had gone to take rest, whether they were freed from household chores and, if so, for how many days. Seventy-one percent of women did not go to their mothers' place or any other place for rest (Table 9.11). Ten percent of women had been to their mothers' place for less than ten days and about 20 percent for more than ten days. While 60 percent of women said that they were freed from household chores completely, 18 percent were freed to some extent. About 22 percent of women had to bear the burden by themselves. For 28 percent help in household chores was available for less than ten days. For every other woman help in household chores was available for 10 days or more.

Table 9.11 Number of days stayed at parents place or elsewhere for rest (in days) after induced abortion and freedom from household chores

Number of days stayed in parents place or elsewhere after abortion	Frequency	Percent
< 10 days	19	9.6
10 – 19 days	21	10.6
20 – 120 days	18	9.1
Not gone for parents place/elsewhere	140	70.7
Freed of household chores?		
Yes – completely	119	60.1
Some what	36	18.2
No	43	21.7
Number of days freed from household work		
Not taken rest	43	21.7
< 10 days	56	28.3
10 – 19 days	48	24.2
20 – 89 days	45	22.7
90 – 1460 days	6	3.0
Total	198	100.0

Help in household chores was from women from mother's side (33 percent), women from husband's side (23 percent), and men from husband's side (10 percent) (Table 9.12). For 6 percent of women there were no children under 10 years of age at the time they had induced abortion. For one-fourth of women there was no help from any one to take care of children less than 10 years of age. For one-third of women there was help from women from mother's side in taking care of young children (Table 9.13). The second major source for help in caring young children came from women from husband's side.

Table 9.12 Person helped in household chores soon after induced abortion

Relationship of person to the woman	Frequency	Percent
No help from anyone	43	21.7
Women from mother's side	65	32.8
Women from husband's side	46	23.2
Men from husband's side	20	10.1
Women from both sides	8	4.0
Women and men from husband's side	5	2.5
Husband and women from mother's side	2	1.0
Other female relative	9	4.5
Total	198	100.0

Table 9.13 Help in caring children less than 10 years of age, if any, during post- induced abortion period

Relationship of person to the woman	Frequency	Percent
No child < 10 years old	11	5.6
No help from anyone	48	24.2
Women from mother's side	66	33.3
Women from husband's side	34	17.2
Men from husband's side	16	8.1
Women from both sides	13	6.6
Other female relative	7	3.5
Daughter	3	1.5
Total	198	100.0

Provider's Advice and Care

Out of 198 cases of induced abortions, 32 were done in public institutions and 158 in private institutions and the rest in non-institutional settings. In what follows, only abortions done in institutions are analysed to compare the care provided by public and private institutions. Consent from husband of a woman seeking abortion is not required by the Act, but to be on the safer side service providers routinely seek husband's consent. In both public and private institutions consent from husbands of women who approached for induced abortion were obtained from little more than four-fifths of the cases before performing abortion as reported by women (Table 9.14). There is not much difference in this aspect between public and private institutions.

Table 9.14 Husband's consent before going in for induced abortion

Husband's consent	Place where induced abortion was performed					
	Public institution		Private institution		Total	
	Number	Percent	Number	Percent	Number	Percent
Obtained	27	84.4	130	82.3	157	82.6
Not obtained	4	12.5	28	17.7	32	16.8
Don't know	1	3.1	--	--	1	0.5
Total	32	100.0	158	100.0	190	100.0

* 8 cases attended by non-institutional health care providers are not shown.

Women were asked about the precautionary care suggested by doctor soon after abortion. Refraining from arduous tasks, abstaining from sex and use of some contraception are the only suggestions listed by the respondents. Refraining from arduous tasks for some time had been suggested by doctors to about 35 percent of women who underwent abortion whether in public institutions or in private institutions (Table 9.15). Further, 12 and 17 percent of women were advised by doctors of public and private institutions to abstain from sex for some time. While all women who underwent abortion in public institutions were given some advice, 4 percent of women who had abortion in private institutions did not receive any advice from doctors.

Table 9.15 Doctor's advise on precautionary care after induced abortion

Doctor's advice	Public institution		Private institution		Total	
	Number	Percent	Number	Percent	Number	Percent
Take rest	19	59.4	80	50.6	99	52.1
Do not perform arduous tasks	9	28.1	40	25.3	49	25.8
Do not perform arduous tasks and abstain from sex for some time	1	3.1	8	5.1	9	4.7
Abstain from sex for some time	2	6.3	6	3.8	8	4.2
Use contraception	--	--	5	3.2	5	2.6
All the above	1	3.1	12	7.6	13	6.8
Nothing was told	--	--	7	4.4	7	3.7
Total	32	100.0	158	100.0	190	100.0

* 8 cases attended by non-institutional health care providers are not shown.

Follow up service is very important to avoid complications or detecting post-abortion complications early. In case of women who had abortion in public institutions 69 percent were asked by doctors to return to them for checkup (Table 9.16). This percentage is only 63 in the case of those who had abortion in private institutions. There is not much of difference in the proportion of women returning for checkup among those who were asked to come back between public and private institutions. Among those who were requested by doctors to come back for checkup 27 percent of those who had abortion in public institutions did not go back for checkup, this percentage is 25 among those who had abortion in private institutions.

Table 9.16 Whether doctor asked to come back for checkup and number of days after the abortion woman went for checkup

Women went for checkup	Person performed Induced Abortion					
	Public institution		Private institution		Total	
	Number	Percent	Number	Percent	Number	Percent
Doctor did not ask	10	31.2	58	36.7	68	35.8
Doctor asked	22	68.8	100	63.3	122	64.2
Among those who were asked to come for checkup						
Next day	7	31.8	34	34.0	41	33.6
2-7 days	2	9.1	30	30.0	32	26.2
8-30 days	5	22.7	9	9.0	14	11.5
After 30 days	2	9.1	2	2.0	4	3.3
Did not go in spite of doctor's advice	6	27.3	25	25.0	31	25.4

* 8 cases attended by non-institutional health care providers are not shown.

Women were specifically asked about Doctor's advise on use of contraception after induced abortion and the responses are presented in Table 9.17. Over three-fourths of the women (78 percent) among those who had abortion in public institutions were either sterilized soon after abortion (22 percent) or advised to use one or other method of contraception (56 percent) by doctors. The corresponding percentages are 70, 4 and 65 among women who had abortion in private institutions. As regards the methods suggested by doctors, sterilization is almost the only method recommended by doctors in public institutions. Doctors in private institutions suggest some spacing methods also. Women who had abortion were also asked as to whether the doctor put condition that the woman would use contraception after abortion. While doctors in public institutions place such condition to 32 percent of women, doctors in private institutions stress it to 3 percent of women only. Based on these, it may be concluded that post-abortion consulting service is much better in public institutions than in the private institutions.

Table 9.17 Doctor's advise on use of contraception following induced abortion

Doctor's advise	Public institution		Private institution		Total	
	#	%	#	%	#	%
Use contraception						
Yes	18	56.3	103	65.2	121	63.7
No	7	21.9	48	30.4	55	28.9
Done sterilization soon after IA	7	21.9	7	4.4	14	7.4
Type of method advised *						
Sterilization	24	96.0	69	62.7	93	68.9
Copper – T	1	4.0	30	27.3	31	23.0
Withdrawal	0	0.0	4	3.6	4	3.0
Oral pill	0	0.0	1	0.9	1	0.7
Use of other temporary method	0	0.0	6	5.5	6	4.4
Put condition that the woman would use contraception after IA *						
Yes	8	32.0	3	2.7	11	8.1
No	17	68.0	107	97.3	124	91.9

* 55 cases were not advised to use contraception and 8 cases non-institutional health care providers.

CHAPTER 10

COMPLICATIONS FOLLOWING SPONTANEOUS AND INDUCED ABORTIONS

10.1 Post-Spontaneous Abortion Complications and Differentials

Information on complications experienced by women following spontaneous or induced abortion is useful to assess the quantum of post-abortion services required and the kind of problem with which a woman is likely to seek service from a health care provider. The problems faced by women following spontaneous abortion are as reported by women. Hence only symptoms of perceived complications are obtained. The total number of spontaneous abortions after 1996 to the date of survey period is 263 cases in our sample. Women were asked to report whether they had experienced any complications during specific time intervals following abortions. Some women did report more than one discomfort. Out of 263 spontaneous abortions only for 26 (9.9 percent) women did not experience any complication any time after the spontaneous abortion. Table 10.1 presents the percent of abortions following which any complication is experienced by women by time period following abortion. The percent of women experiencing complications is very high immediately after the occurrence of spontaneous abortion that is within two hours since spontaneous abortion. Eighty-five percent of the cases experienced one or other complication within two hours after the event. The percent of women experiencing one or other complication is also high (78 percent) in the period after two hours but within a day following spontaneous abortion. Sixty-two percent of the cases experienced some complication after 24 hours but within a week. The percent experiencing some complication declines as the time since spontaneous abortion increases. The percent experiencing complication reduces to 0.8 after 6 weeks since abortion.

Table 10.1 Percent experiencing one or other complication after spontaneous abortion

Time period following spontaneous abortion	Experiencing complication	
	Number	Percent
Within 2 hours	224	85.2
After 2 hours but within 24 hours	206	78.3
After 24 hours but within a week	163	62.0
During 2 nd and 3 rd weeks	44	16.7
During 4 th , 5 th and 6 th weeks	9	3.4
After 6 weeks	2	0.8
Permanent nature	1	0.4

* Total number of cases is 263

Table 10.2 provides the percent of women experiencing post-abortion complications in the period after 24 hours but within eight days following the incidence of spontaneous abortion and in the period after eight days but within three weeks following spontaneous abortion by background characteristics. The percent among urban women is 66.0 and it is 59.8 among rural women in the period after a day but within a week. During second and third weeks after spontaneous abortion 17.8 percent of rural women and 14.9 percent of urban women experienced complications. The higher the age at the time of spontaneous abortion or pregnancy order, the higher is the chance that a woman will experience post-abortion complication. Clearly there is association between gestational age and chance of post-abortion complication. The incidence of post-abortion complication increases with increase in gestational age at the time of spontaneous abortion. There does not seem to be any systematic change in the incidence of post- spontaneous abortion complications with either the level of woman's education or asset index. For that matter there is no difference in the incidence of complication following spontaneous abortion between public or private health care provider who has been approached by woman for checkup. The incidence of post-abortion complications is less among those who did not seek medical help soon after spontaneous abortion compared to those who sought medical service. This does not mean that medical assistance is responsible for post-abortion complications. But it is selectivity problem that those who have some severe complication resort to medical help.

Table 10.2 Percent of women experiencing post-abortion complications following spontaneous abortion by background characteristics

Background characteristics	Number of women experiencing spontaneous abortion	Percent of women experiencing one or other problem during the period	
		After 24 hours but within a week following the event	During 2 nd and 3 rd week following the event
All	263	62.0	16.7
Place of residence			
Rural	169	59.8	17.8
Urban	94	66.0	14.9
Age at the time of event			
Less than 20	57	59.6	14.0
20-24	122	59.0	15.6
25-29	54	64.8	22.2
30+	30	73.3	16.7
Pregnancy order			
1	92	56.5	15.2
2&3	134	63.4	17.2
4+	37	70.3	18.9
Birth order			
0	144	60.4	13.9
1	73	68.5	23.3
2+	46	56.5	15.2
Gestational length			
Less than 12 weeks	46	60.9	6.5
12-15 weeks	142	59.2	17.6
16 or more weeks	75	68.0	21.3

Education of mother			
Illiterate	47	59.6	17.0
Literate & primary complete	101	64.4	17.8
Middle school complete	54	55.6	18.5
High school complete	61	65.6	13.1
Asset Index			
Low	83	66.3	26.5
Medium	95	56.8	10.5
High	85	63.5	14.1
Health care provider			
No problem	63	52.4	14.3
Public institution	30	66.7	20.0
Private provider	161	67.1	18.0
Self treatment	7	28.6	0.0
Untrained care provider	2	0.0	0.0
Kind of treatment			
No treatment sought	63	52.4	14.3
Scan	4	75.0	50.0
Checkup	9	77.8	33.3
D&C	124	66.1	17.7
Injections and drips	55	65.5	14.5
Herbal juice/jaggary	8	25.0	0.0

Table 10.3 lists the problems experienced by women following spontaneous abortion and the percent of women experiencing during specified time intervals following abortion. Excessive bleeding is the largest single symptom reported by women in any period following spontaneous abortion. Thirteen percent of women experienced excessive bleeding even after a week since occurrence of the event. One woman reported that excessive bleeding has become a permanent feature. The second symptom in the order of frequency is abdominal pain. After 24 hours of the event but within a week 23 percent of women experienced abdominal pain and 5 percent experienced it even after a week. Within a week but after 24 hours of the incidence of spontaneous abortion 11 percent of women reported their experience with stomach pain.

It is possible that many of these women were not distinguishing lower abdominal pain from stomach pain and hence reported as stomach pain. In Tamil ‘Vayiru’ means stomach and ‘Adi Vayiru’ (literally meaning lower part of stomach) means abdomen. It is, therefore, possible for women to report generally as ‘Vayiru’ instead of ‘Adi Vayiru’. Again another 11 percent of women report body/hand/leg pain. These reduce to 2 and 5 percent respectively after eight days. Tiredness, fainting and dizziness, back/hip pain and general weakness are the other symptoms reported by about 3-5 percent of women. About 2 percent of women reported that the problem of white discharge has become a permanent feature in their life after the spontaneous abortion.

Table 10.3 Percent experiencing specific symptoms during various periods following spontaneous abortion

Complications	Within 24 hours		After 24 hours but within a week		During 2 nd and 3 rd weeks		During 4 th , 5 th and 6 th weeks		After 6 weeks		Permanent nature	
	#	%	#	%	#	%	#	%	#	%	#	%
Excessive bleeding	159	60.5	126	47.9	34	12.9	4	1.5	2	0.8	1	0.4
Lower abdominal pain	104	39.5	60	22.8	14	5.3	4	1.5	---	---	---	---
Stomach pain	44	16.7	29	11.0	6	2.3	1	0.4	---	---	---	---
Body/hand/leg pain	42	16.0	30	11.4	14	5.3	4	1.5	1	0.4	---	---
Back/hip pain	19	7.2	7	2.7	2	0.8	1	0.4	1	0.4	2	0.8
Fainting/dizziness	14	5.3	10	3.8	1	0.4	1	0.4	---	---	---	---
Tiredness	10	3.8	13	4.9	3	1.1	---	---	---	---	1	0.4
Fever & cough	8	3.0	2	0.8	2	0.8	---	---	---	---	---	---
Headache	6	2.3	---	---	---	---	---	---	1	0.4	1	0.4
General weakness	9	3.4	9	3.4	4	1.5	3	1.1	2	0.8	---	---
Chest pain	4	1.5	2	0.8	---	---	---	---	---	---	---	---
White discharge	2	0.8	1	0.4	---	---	---	---	---	---	6	2.3
Vomiting	3	1.1	1	0.4	---	---	---	---	---	---	---	---
Loss of appetite	2	0.8	---	---	---	---	---	---	---	---	---	---
Fits	1	0.4	1	0.4	1	0.4	---	---	---	---	---	---
Blood stained discharge	1	0.4	1	0.4	---	---	---	---	---	---	---	---
Breast pain	1	0.4	---	---	---	---	---	---	---	---	---	---
High blood pressure	1	0.4	---	---	---	---	---	---	---	---	---	---
Itching around external genitalia	1	0.4	---	---	---	---	---	---	---	---	---	---

* Percent is computed to the total number of 263 cases.

10.2 Post-Induced Abortion Complications and Differentials

The total number of induced abortions after 1996 to the end of survey period in our sample was 198. Of these, 18 women (9.1 percent) reported that they did not experience any complication any time after induced abortion. Table 10.4 presents the percent of abortions following which any complication is experienced by women by time period following induced abortion. The percent of women experiencing complication is very high immediately after induced abortion, that is within two hours. Eighty-five percent of the cases experienced one or other complication within two hours after the event. The percent of women experiencing one or other complication is also high (80 percent) in the period after two hours but within a day following induced abortion. Sixty-three percent of the cases experienced some complication after 24 hours but within a week. The percent experiencing some complication declines as the time since induced abortion increases. The percent experiencing complications reduces to 2.6 after 6 weeks since induced abortion. Two percent of women experience one or the other complication permanently.

Table 10.4 Percent experiencing one or other complication after induced abortion

Time since induced abortion	Experiencing complication	
	Number	Percent
Within 2 hours	169	85.4
After 2 hours but within 24 hours	158	79.8
After 24 hours but within a week	125	63.1
During 2 nd and 3 rd weeks	45	22.7
During 4 th , 5 th and 6 th weeks	10	5.1
After 6 weeks	5	2.5
Permanent nature	4	2.0

* Percentages are computed to the total of 198 induced abortions.

In Table 10.5 the percent of women experiencing post-induced abortion complications after a day but within a week following the incidence is 63. Among urban women the proportion experiencing complications during this period is marginally less (62 percent) than among rural women (64 percent). The proportion experiencing complication is greater among women under age 25. Clearly, as the pregnancy order and birth order increase the percent of women experiencing complications decreases. The number of induced abortions under 8 weeks of gestation and more than 15 weeks of gestation is very small. Induced abortion done in the first trimester has less chance of leading to some complication than do those done in the second trimester. As far as education of woman is concerned, it is seen that those who have at least completed high school, experience low incidence of post-abortion problem compared to others. No systematic relationship between asset index and incidence of complication is found.

Incidence of post-abortion complication is found to be low among those done by private providers than among those done in public institutions or by others. Of course, private providers need necessarily be qualified doctors with proper training in abortion procedures. Incidence of complication following D&C procedure is higher than that following injection and tablets for inducing, possibly because injections and tablets are used for early abortions while D&C is done for pregnancies with longer gestational age.

Table 10.5 Percent of women experiencing post-abortion complications after induced abortion by background characteristics

Background characteristics	Number of women experiencing induced abortion	Percent of women experiencing one or other problem during the period	
		After 24 hours but within a week following the event	During 2 nd and 3 rd week following the event
All	198	63.1	22.7
Place of residence			
Rural	116	63.8	29.3
Urban	82	62.2	13.4
Age at the time of event			
Less than 20	13	76.9	23.1
20-24	55	63.6	25.5
25-29	67	59.7	20.9
30+	63	63.5	22.2
Pregnancy order			
1	4	100.0	50.0
2&3	84	66.7	22.6
4+	110	59.1	21.8
Birth order			
0	25	72.0	36.0
1	59	67.8	22.0
2+	114	58.8	20.2

Gestational length			
Less than 8 weeks	23	60.9	30.4
8-11 weeks	95	56.8	20.0
12-15 weeks	61	72.1	24.6
16 or more weeks	19	68.4	21.1
Less than 12 weeks	118	57.6	22.0
12 or more weeks	80	71.3	23.8
Education of mother			
Illiterate	43	60.5	30.2
Literate & Primary Sch. complete	68	66.2	25.0
Middle School complete	28	71.4	25.0
High School complete	59	57.6	13.6
Asset Index			
Low	52	63.5	28.8
Medium	69	56.5	18.8
High	77	68.8	22.1
Health care provider*			
Private institution	158	59.5	18.4
Public institution	32	75.0	37.5
Untrained health care provider	5	80.0	60.0
Medical shop	2	100.0	50.0
Kind of treatment*			
D & C	174	63.2	22.4
Injection and tablets	21	57.1	19.0
Insertion of foreign body	2	100.0	100.0

* One person refused to answer this question

According to earlier studies excessive bleeding and lower abdominal pain are the most common post-abortion complaints. The other less frequent complaints are high fever, foul smelling discharge, backache and weakness (Ganatra and Hirve, 2002; Srinivasa et al., 1997). Results from our study are not very different from them. As

evident from the Table 10.6 bleeding and pain (abdominal pain, body/hand/leg pain and stomach pain) are the most common complications reported by many women after induced abortion. Twelve percent of women complained excessive bleeding even after a week since occurrence of the event. Eleven percent of the women experienced abdominal pain during 2nd and 3rd week following the induced abortion. Another 3.5 percent reported stomach pain. As explained earlier there is a possibility that many women might have reported abdominal pain as stomach pain. Back/hip pain has become a permanent problem for 2 percent of women and white discharge has become a permanent problem to another 2 percent.

Table 10.6 Percent experiencing specific symptoms during various periods following induced abortion

Complications	Within 24 hours		After 24 hours but within a week		During 2 nd and 3 rd weeks		During 4 th , 5 th and 6 th weeks		After 6 weeks		Permanent nature	
	#	%	#	%	#	%	#	%	#	%	#	%
Excessive bleeding	91	46.0	74	37.4	23	11.6	5	2.5	2	1.0	---	---
Lower abdominal pain	82	41.4	42	21.2	21	10.6	6	3.0	2	1.0	---	---
Body/hand/leg pain	34	17.2	18	9.1	10	5.1	5	2.5	4	2.0	1	0.5
Stomach pain	28	14.1	23	11.6	7	3.5	---	---	---	---	1	0.5
Fainting/dizziness	13	6.6	7	3.5	1	0.5	1	0.5	---	---	---	---
Tiredness	15	7.6	11	5.6	6	3.0	---	---	---	---	1	0.5
Back/hip pain	13	6.6	7	3.5	5	2.5	4	2.0	4	2.0	4	2.0
General weakness	10	5.1	8	4.0	5	2.5	---	---	---	---	---	---
Fever and cough	6	3.0	4	2.0	3	1.5	---	---	---	---	---	---
Headache	4	2.0	1	0.5	1	0.5	1	0.5	1	0.5	---	---
Vomiting	2	1.0	1	0.5	---	---	---	---	---	---	---	---
Spotting	2	1.0	2	1.0	2	1.0	2	1.0	1	0.5	---	---
Fast heart beating	1	0.5	---	---	---	---	---	---	---	---	---	---
Pain following sterilization	2	1.0	1	0.5	1	0.5	1	0.5	---	---	---	---
High blood pressure	---	---	---	---	---	---	---	---	---	---	---	---
Low blood pressure	---	---	1	0.5	---	---	---	---	---	---	---	---
Disturbed behaviour	---	---	1	0.5	1	0.5	---	---	---	---	---	---
Anaemia	---	---	1	0.5	1	0.5	---	---	---	---	---	---
White discharge	---	---	---	---	---	---	---	---	1	0.5	3	1.5

* Percent is computed to the total number of 198 cases as there are multiple responses.

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APPENDIX A

ESTIMATES OF
INDUCED ABORTION RATE
USING RESIDUAL METHOD

The proximate determinants model developed by Bongaarts has been used to estimate induced abortion rate by a number of persons (Rossier, 2003). According to Bongaarts the total fertility rate (TFR) can be estimated by assuming a theoretical level of biological maximum fertility (TF) of 15.3 and four indices of fertility reducing effect of marriage (Cm), contraception (Cc), abortion (Ca) and postpartum infertility (Ci) (Bongaarts and Potter, 1983). This is expressed in the form of product of the biological maximum fertility and the four indices:

TFR = TF * Cm * Cc * Ca * Ci. (1)

In this Cm = [Σ m(a) g(a)] / Σ g(a), where m(a) is the proportion married at age a and g(a) is the age specific marital fertility rate. Indeed Σ m(a) g(a) is the TFR. Cc is estimated by [1 – 1.08 * u * e], wherein u is the proportion of currently married women using contraception and

e = [Σ e(m) u(m)] / Σ u(m). (2)

In here e(m) is the use-effectiveness of the method m and u(m) is the proportion of currently married women using the method m. Ca is computed by

TFR / [TFR + 0.4 * (1 + u) * TA], (3)

where TA is the average number of abortions per women at the end of the reproductive period, and u is the proportion of women using contraception as defined earlier. Finally Ci, the index of postpartum infertility is computed as:

$$C_i = 20 / [18.5 + i],$$

(4)

where ‘i’ is the average duration of postpartum infecundity or postpartum abstinence. If ‘i’ is not available, it is again computed with the help of mean duration of breastfeeding, b, by the following relationship:

$$i = 1.753 \exp[0.1396 * b - 0.001872 * b^2].$$

The equation (1) can be written differently to estimate the abortion rate from the knowledge of others.

$$C_a = TFR / [TF * C_m * C_c * C_i]$$

(5)

With the help of data from the National Family Health Surveys 1 & 2 (NFHS-1&2, 1994 and 2001) C_m, C_c and C_i are estimated. Table A.1 shows the estimation of C_m for the two time periods.

Table A.1 Estimation of C_m for the two time periods from the NFHS-1&2

Age of woman	Period 1989-91			Period 1996-98		
	Age specific fertility rate m(a)g(a)	Proportion of married women m(a)	Age specific marital fertility rate G(a)	Age specific fertility rate m(a)g(a)	Proportion of married women m(a)	Age specific marital fertility rate G(a)
15 – 19	0.087	0.2445	0.3558	0.083	0.2331	0.3561
20 – 24	0.203	0.7140	0.2843	0.189	0.6623	0.2854
25 – 29	0.132	0.8819	0.1497	0.121	0.8658	0.1398
30 – 34	0.051	0.8881	0.0574	0.032	0.8999	0.0356
35 – 39	0.019	0.8928	0.0213	0.010	0.8550	0.0117
40 – 44	0.004	0.8704	0.0046	0.003	0.8203	0.0036
45 – 49	0.000	0.8222	0.0000	0.000	0.7794	0.0000
Sum	0.496*5= 2.480		0.8731*5= 4.3665	0.438*5= 2.190		0.8322*5= 4.1610

Source: Tables 5.3 and 5.6 of NFHS-1 report and Tables 4.2 and 4.6 of NFHS-2 report.

C_m for the year 1992 = 2.480/4.3665= .5681
C_m for the year 1999 = 2.190/4.1610= .5263

The index of contraception is computed with assumed level of use-effectiveness contraception and the proportion of users of various types of contraception as obtained by the national family health surveys. These are given in table A.2 below.

Table A.2 Proportion of users of various types of contraception and the assumed level of use-effectiveness

Contraception	Use-effectiveness e(m)	1992	1999
		Proportion of users u(m)	Proportion of users u(m)
Pills	0.90	0.036	0.003
IUD	0.95	0.092	0.025
Sterilization	1.00	0.395	0.460
Others	0.70	0.038	0.033
		0.561	0.521

Source: Table 6.3 of NFHS-1 report and table 5.3 of NFHS-2 report.

The parameter e is computed using equation (2) for the year 1992 as 0.9651 and for the year 1999 as 0.9780. The index for the effect of contraception, Cc, is 0.4153 for the year 1992 and 0.4497 for 1999.

The mean duration of postpartum infecundity is 8.5 months in 1992 (Table 5.14 of NFHS-1 report) and 7.4 months in 1999 (Table 4.11 of NFHS-2 report). With these the Ci is computed to be 0.7407 for 1992 and 0.7722 for 1999.

Plugging in these quantities in equation (5), we arrive at Ca of 0.9275 for 1992 and 0.7832 for 1999. Now writing equation (3) differently, we get

$$TA = [(TFR/Ca) - TFR]/0.4(1 + u). \qquad \qquad \qquad (6)$$

Substituting the appropriate quantities computed earlier in this equation TA has been computed as 0.3103 for 1992 and as 0.9965 for 1999. TA refers to the number of abortions at the end of reproduction. Hence the ratio of abortion to live birth is TA/TFR, which are 12.51 abortions per 100 live births in 1992 and 45.50 abortions per 100 live births in 1999.

These estimates, 12.5 abortions per 100 live births in 1992 and 45.5 abortions per 100 live births in 1999, seem to be too far apart to accept. Rossier (2003) has pointed out that the estimate obtained by this residual method is very sensitive to errors in the estimates of other parameters involved. To understand how sensitive the abortion estimate is to errors in other parameters, we provide the following information. If the proportion of contraceptive users is overestimated by one percentage point in 1992, that is 57.1 percent instead of 56.1 percent, Cc would then be 0.40487, and Ca would then be 0.9575. This would yield TA of 0.1751 and the

corresponding abortion estimate would be 7.1 abortions per 100 live births; a difference in the estimate of 5.4 abortions per 100 live births. Similarly if the postpartum infecundity were overestimated by one month, that is 9.5 months instead of 8.5 months, the final estimate abortions would be 6.4 abortions per 100 live births instead of 12.5 abortions. These indicate that the estimate of abortion rate using residual method is very sensitive to errors in input data in other indices of the proximate determinants model.

In fact the proportion of contraceptive users is reported to be 56 percent in 1992 and only 52 percent in 1999. It is hard to accept that the percentage of users of family planning methods falls over years. Unless this doubt is cleared and the data are free from errors, it is very difficult to estimate abortion rate using this residual method.

APPENDIX B

LIST OF PRIMARY SAMPLING UNITS

Table B.1 List of Primary Sampling Units with location number, urban/rural, team responsible for interview and period of interview

Sl. No.	Name of Village/Ward	Name of Block	Name of Taluk	Name of District	Urban / rural	Time of Field Work	Team
1	Umar Pulavar nagar ward 88			Madras	Urban	26.02.03 to 03.03.03	III
2	Ayyanavaram ward 56			Madras	Urban	04.03.03 to 08.03.03	III
3	Thiru Vi. Ka. nagar ward 38			Madras	Urban	10.02.03 to 15.02.03	V
4	Saidapet East ward 135			Madras	Urban	19.02.03 to 24.02.03	V
5	Annanagar west ward 66			Madras	Urban	27.02.03 to 03.03.03	V
6	Avadi MTS ward 30		Sriperumpudur	Thiruvallur	Urban	14.03.03 to 18.03.03	IV
7	Thodukadu	Kadambathur	Thiruvallur	Kanchipuram	Rural	08.03.03 to 12.03.03	IV
8	Tirusulam ward 4		Saidapet	Kanchipuram	Urban	20.02.03 to 25.02.03	III
9	Kanchipuram main ward 37		Kanchipuram	Kanchipuram	Urban	26.02.03 to 01.03.03	IV
10	Alappakkam	Kattankulathur	Chengalpattu	Kanchipuram	Rural	03.03.03 to 06.03.03	IV
11	Palayam	Timiri	Arcot	Vellore	Rural	15.02.03 to 18.02.03	IV
12	Alamelumangapuram	Vellore	Vellore	Vellore	Rural	11.02.03 to 14.02.03	IV
13	Vellore main ward 11		Vellore	Vellore	Urban	07.02.03 to 10.02.03	IV
14	Athiyur	Vellore	Vellore	Vellore	Rural	30.01.03 to 05.02.03	IV
15	Melmanavunur	Vellore	Vellore	Vellore	Rural	25.01.03 to 28.01.03	IV
16	Gudiyattam main ward 26		Gudiyattam	Vellore	Urban	18.01.03 to 23.01.03	IV
17	Cheruvanki VP ward 1		Gudiyattam	Vellore	Urban	11.01.03 to 16.01.03	IV

					Rural	05.01.03 to 09.01.03	IV
18	Periyankuppam	Periyankuppam	Vaniyambadi	Vellore	Rural	20.02.03 to 24.02.03	IV
19	Endavadi	Cheyyar	Cheyyar	Thiruvannamalai	Rural	30.12.02 to 04.01.03	IV
20	Nambiyambut	Jawadhu Hills	Pelur Chengambadi	Thiruvannamalai	Rural	20.01.03 to 24.01.03	V
21	Avur	Keelpennathur	Tiruvannamalai	Tiruvannamalai	Rural	09.01.03 to 12.01.03	V
22	Thenmudiyanur	Thandrapet	Chengam	Tiruvannamalai	Rural	23.12.02 to 28.12.02	IV
23	Nagojanahalli	Kaveripattinam	Krishnagiri	Dharmapuri	Rural	16.12.02 to 21.12.02	IV
24	Pudinattam	Pappireddippatti	Harur	Dharmapuri	Rural	27.01.03 to 31.01.03	V
25	Olakkur kilpadi	Olakkur	Tindivanam	Vizhupuram	Rural	02.01.03 to 07.01.03	V
26	Oddambattu	Gingee	Gingee	Vizhupuram	Rural	03.02.03 to 07.02.03	V
27	Tiruchitrambalam	Vanur	Vanur	Vizhupuram	Rural	27.12.02 to 31.12.02	V
28	Chendur	Mailam	Tindivanam	Vizhupuram	Rural	22.12.02 to 26.12.02	V
29	Kappur	Kolianur	Vizhupuram	Vizhupuram	Rural	17.12.02 to 21.12.02	V
30	Thiruvennainallur	Thiruvennainallur	Tirukkivilur	Vizhupuram	Rural	11.12.02 to 16.12.02	V
31	Pavandur	Rishivandiam	Kallakurchi	Vizhupuram	Rural	14.02.03 to 19.02.03	III
32	Cuddalore main ward 27		Cuddalore	Cuddalore	Urban	08.02.03 to 13.02.03	III
33	Parangipettai TP ward 7		Chidambaram	Chidambaram	Urban	03.02.03 to 07.02.03	III
34	Manjakkuli	Parangipettai	Chidambaram	Cuddalore	Rural	17.01.03 to 21.01.03	III
35	Valasai	Nallur part	Virudhachalam	Cuddalore	Rural	22.01.03 to 27.01.03	III
36	Tholur	Kammapuram	Virudhachalam	Cuddalore	Rural	28.01.03 to 01.02.03	III
37	Agara Alambadi	Bhuvanagiri	Chidambaram	Cuddalore	Rural	23.12.02 to 28.12.02	III
38	Sendarapatty	Gangavalli	Athur	Salem	Rural	16.12.02 to 21.12.02	III
39	Muttal	Attur	Attur	Salem	Rural	09.12.02 to 14.12.02	III
40	Kulathukombai	Valapady	Salem	Salem	Rural	02.12.02 to 07.12.02	III
41	Thadampatti ward 1		Salem	Salem	Urban	25.11.02 to 30.11.02	III
42	Salem city ward 46		Salem	Salem	Urban	18.11.02 to 23.11.02	III
43	Kadendapatti	Puduchatram	Namakkal	Namakkal	Rural	04.12.02 to 10.12.02	V
44	Chinnakavundanur b/c	Sankari	Sankari	Namakkal	Rural	28.11.02 to 03.12.02	V
45	Katteri	Sankari	Sankari	Namakkal	Rural	13.11.02 to 19.11.02	IV
46	Nallur	Paramathi	Paramathivelur	Namakkal	Rural	06.11.02 to 13.11.02	V
47	Kuppandampalayam	Andiyur	Bavani	Erode	Rural	14.11.02 to 20.11.02	V
48	Punjaithuraipalayam	Thookanaicken palayam	Gobichettipalayam	Erode	Rural	22.11.02 to 27.11.02	V
49	Erode municipality Ward 6		Erode	Erode	Urban	26.10.02 to 05.11.02	V
50	Kanagapuram	Modakurichi	Erode	Erode	Rural	20.11.02 to 25.11.02	IV
51	Sircarkathaganni	Uthukuli	Perundurai	Erode	Rural	06.11.02 to 12.11.02	IV
52	Anjur	Kodumudi	Erode	Erode	Rural	28.10.02 to 03.11.02	III
53	Mulanur	Mulanur	Dharapuram	Erode	Rural		

54	Hullathi	Uthagamandalam	Uthagamandalam	Nilgiris	Rural	20.03.03 to 27.03.03	III
55	Naduhatty	Kothagiri	Kothagiri	Nilgiris	Rural	12.03.03 to 19.03.03	III
56	Kattampatti	Annur	Avanashi	Coimbatore	Rural	09.12.02 to 14.12.02	IV
57	Mudalipalayam	Tiruppur	Tiruppur	Coimbatore	Rural	26.11.02 to 01.12.02	IV
58	Coimbatore ward 26		Coimbatore south	Coimbatore	Urban	02.12.02 to 07.12.02	IV
59	Valparai PTS Ward 94		Valparai	Coimbatore	Urban	17.03.03 to 21.03.03	V
60	Valparai PTS ward 56		Valparai	Coimbatore	Urban	10.03.03 to 15.03.03	V
61	Karapudayanpatti sobanapurami	Uppilyapuram	Thuraiyur	Tiruchi	Rural	30.12.02 to 04.01.03	III
62	Elaiyur west	Andimadam	Udayarpalayam	Ariyalur	Rural	06.01.03 to 11.01.03	III
63	Kondal	Sirkazhi	Sirkazhi	Nagapattinam	Rural	22.01.03 to 27.01.03	II
64	Sirupuliyur	Nannilam	Nannilam	Nagapattinam	Rural	11.01.03 to 20.01.03	II
65	Balarajapuram	Krishnarayapuram	Kulithalai	Karur	Rural	11.11.02 to 16.11.02	III
66	Thanthoni a/b	Thanthoni	Karur	Karur	Rural	29.10.02 to 05.11.02	IV
67	Pungambadi west	Aravakurichi	Karur	Karur	Rural	05.11.02 to 10.11.02	III
68	Kumbakonam ward 4		Kumbakonam	Thanjavur	Urban	28.01.03 to 01.02.03	II
69	Milattur III sethi	Ammapettai part	Papanasam	Thanjavur	Rural	16.12.02 to 21.12.02	II
70	Ammapettai TP ward 4		Papanasam(new) Valangaiman(old)	Tanjavur (Old) Tiruvarur (New)	Urban	09.12.02 to 14.12.02	II
71	Pattukkottai main ward 4		Pattukkottai	Thanjavur	Urban	15.02.03 to 19.02.03	II
72	Thambikkottai main ward 4	Pattukkottai	Pattukkottai	Thanjavur	Rural	20.02.03 to 23.02.03	II
73	Lalgudi town ward 14		Lalgudi	Tiruchi	Urban	02.12.02 to 07.12.02	II
74	Tiruchi main ward 33		Tiruchi	Tiruchi	Urban	25.11.02 to 30.11.02	II
75	Peraiyur a/b	Nidamangalam part	Mannargudi(new) Nidamangalam (old)	Thiruvarur	Rural	24.12.02 to 28.12.02	II
76	Mannargudi main ward 9		Mannargudi	Thiruvarur	Urban	30.12.02 to 04.01.03	II
77	Thiruvarur main ward 9		Thiruvarur	Thiruvarur	Urban	06.01.03 to 10.01.03	II
78	Vattar	Kottur part	Mannargudi	Thiruvarur	Rural	04.02.03 to 07.02.03	II
79	Maruthur vadakku sethi	Vedaranniyam	Vedaranniyam	Nagapattinam	Rural	10.02.03 to 13.02.03	II
80	Ragalapuram	Shanarpatti	Dindigul	Dindigul	Rural	27.10.02 to 03.10.02	II
81	Dindigul town ward 13		Dindigul	Dindigul	Urban	18.11.02 to 23.11.02	II
82	Perambur	Viralimalai	Kulattur	Pudukkottai	Rural	12.11.02 to 16.11.02	II
84	Paiyur pillai vayal c/e	Sivaganga	Sivaganga part	Sivaganga	Rural	25.02.03 to 02.03.03	II
83	Meppudakkudi	Viralimalai	Kulattur	Pudukkottai	Rural	05.11.02 to 11.11.02	II
85	Madurai main ward 29		Madurai south	Madurai	Urban	12.12.02 to 18.12.02	I
86	Madurai main ward 61		Madurai south	Madurai	Urban	05.12.02 to 11.12.02	I
87	Madurai main ward 31		Madurai south	Madurai	Urban	28.11.02 to 04.12.02	I

88	Thadayampatti	Sedapatti part	Usilampatty	Madurai	Rural	28.10.02 to 05.11.02
89	Rajadhani	Andipatti	Andipatti	Theni	Rural	06.11.02 to 13.11.02
90	Chinnamanur main ward 17		Uttamapalayam	Theni	Urban	21.11.02 to 27.11.02
91	Gokilapuram	Uttamapalayam	Uttamapalayam	Theni	Rural	14.11.02 to 20.11.02
92	Attangarai	Ramanathapuram	Ramanathapuram	Ramanathapuram	Rural	15.03.03 to 19.03.03
93	Nagachi	Ramanathapuram	Ramanathapuram	Ramanathapuram	Rural	23.03.03 to 24.03.03
94	Pattinamkattan	Ramanathapuram	Ramanathapuram	Ramanathapuram	Rural	10.03.03 to 13.03.03
95	Mudukulattur ward 8		Mudukulattur	Ramanathapuram	Urban	04.03.03 to 07.03.03
96	Kundalakkuttur	Sattur	Sattur	Virudhunagar	Rural	19.12.02 to 24.12.02
97	Sevvalpatti	Vembakottai	Sattur	Virudhunagar	Rural	25.12.02 to 31.12.02
98	Srivilliputtur ward 26		Srivilliputtur	Virudhunagar	Urban	08.01.03 to 20.01.03
99	Srivilliputtur ward 14		Srivilliputtur	Virudhunagar	Urban	01.01.03 to 07.01.03
100	Singathakurichchi	Karunkulam	Srivaigundam	Tuticorin	Rural	16.03.03 to 21.03.03
101	Tuticorin main ward 15		Tuticorin	Tuticorin	Urban	23.03.03 to 28.03.03
102	Tuticorin main ward 1		Tuticorin	Tuticorin	Urban	20.03.03 to 26.03.03
103	Naduvakuruchi a/b	Sattankulam	Sattankulam	Tuticorin	Rural	10.03.03 to 15.03.03
104	Naiyanaragaram	Kadayanallur	Thenkasi	Tirunelveli	Rural	21.01.03 to 27.01.03
105	Shencottah ward 13		Shencottah	Tirunelveli	Urban	28.01.03 to 03.02.03
106	Kasthurirangapuram	Radhapuram	Radhapuram	Tirunelveli	Rural	28.02.03 to 08.03.03
107	Vellamcode c/c	Melpuram	Viellamcode	Kanniyakumari	Rural	22.02.03 to 27.02.03
108	Ponmani a/b	Tiruvattar	Kalkulam	Kanniyakumari	Rural	04.02.03 to 09.02.03
109	Azhgappapuram b/b	Agastiswaram	Agastiswaram	Kanniyakumari	Rural	10.02.03 to 15.02.03
110	Nagarcoil ward 6		Agastiswaram	Kanniyakumari	Urban	16.02.03 to 21.02.03

APPENDIX C

ESTIMATES OF SAMPLING ERRORS

Sampling errors and non-sampling errors are the two kinds of errors encountered in estimates from sample surveys. While the sampling error is influenced by the size of the sample and the sampling design adopted, non-sampling errors arise in the process of data collection and data processing. Misidentification of sample respondents, misunderstanding of questions either by the interviewer or the respondent, intentional concealing of facts by respondent, errors in recollection of events, errors while data entry are examples of non-sampling errors. All possible precautions were taken and special efforts were made to avoid such non-sampling errors as far as possible within the time and budget constraints. It is impossible to collect data totally free from non-sampling errors in large-scale surveys from semi-literate population on sensitive areas of the kind we are concerned. As we are aware that evaluating the quantum of non-sampling errors is very difficult, all possible efforts were made to minimize such errors.

Given the same design and the sample size, many samples could be drawn. The estimate from each of these might differ. The sampling error is the standard deviation of these estimates among all possible samples. An estimate of this can be made for any given statistic and that is known as standard error (SE) and the distribution of the sample statistic is known as sampling distribution. For large sample size, a mean or a percentage is distributed normally. Hence the statistic minus 1.96 SE and the statistic plus 1.96 SE give a range within which 95 percent of times the sample statistic will be, if all possible samples of identical design and size are selected. Thus the SE helps in measuring the sampling error.

Stratified cluster sampling is the sampling design followed in this survey. The method of computing sampling error appropriate to the design is given below. In this report percentage or average is considered as a ratio estimate, $y = x/n$, where x is the

value of the variable X and n is the number of cases in the group or subgroup. The SE is computed using the formula.

$$SE = \sqrt{\text{var}(y)} = \text{sqrt} \left[\frac{1-f}{n^2} \sum_{i=1}^I \left\{ \frac{m_i}{m_i-1} \left(\sum_{j=1}^{m_i} z_{ij}^2 - \frac{z_i^2}{m_i} \right) \right\} \right]$$

where $Z_{ij} = x_{ij} - y \cdot n_{ij}$
 $Z_i = x_i - y \cdot n_i$

and
 i stands for the stratum varying from 1 to I,
 m_i is the number of PSUs selected in the i^{th} stratum,
 x_{ij} is the sum of x in j^{th} PSU in the i^{th} stratum,
 n_{ij} is the number of cases in j^{th} PSU in the i^{th} stratum,
 x_i is the sum of x in the i^{th} stratum,
 n_i is the number of cases in the i^{th} stratum, and
 f is the overall sampling fraction.

Standard error is not computed for all variables, as it will be too involved. Only for some important variables sampling errors are computed. Table C.1 gives the list of variables for which the SE is computed. Table C.2 gives the value of the statistic (y), the standard error (SE), the number of cases (n) and the 95 percent confidence interval ($y \pm 1.96$ SE) for each variable.

Table C.1 List of selected variables for sampling errors

Variable	Estimates	Base population
Sex ratio	Ratio	Household population
Sex ratio of 0-4 age population	Ratio	Household population aged 0-4 y
Illiterate women	Proportion	Ever-married women age 15-55
Currently married women	Proportion	Ever-married women age 15-55
Number of children ever born	Mean	Ever-married women age 15-49
Number of male children ever born	Mean	Ever-married women age 15-49
Number of female children ever born	Mean	Ever-married women age 15-49
Number of living children	Mean	Ever-married women age 15-49
Number of male living children	Mean	Ever-married women age 15-49
Number of female living children	Mean	Ever-married women age 15-49
Number of terminations	Mean	Ever-married women age 15-49
Number of spontaneous abortions	Mean	Ever-married women age 15-49
Number of induced abortions	Mean	Ever-married women age 15-49
Number of spontaneous & induced abortions	Mean	Ever-married women age 15-49
Number of live births after 1996	Proportion	Ever-married women age 15-49
Number of stillbirths after 1996	Proportion	Ever-married women age 15-49
Number of spontaneous abortions after 1996	Proportion	Ever-married women age 15-49
Number of induced abortions after 1996	Proportion	Ever-married women age 15-49

Table C.2 Estimates of sampling error for selected indices

Variable	Value (R)	Standard error (SE)	Number of cases (n)	Standard error assuming SRS (SER)	Design effect (DEFT)	Relative standard error (SE/R)	Confidence limits	
							R-2SE	R+2SE
Sex ratio (number of male per one female)								
	1.008	0.010	11336	0.010	1.000	0.010	0.987	1.029
Sex ratio of 0_4 population (number of male per one female)								
	1.018	0.047	940	0.048	0.979	0.046	0.924	1.112
Illiterate (proportion illiterate among EMW 15-55)								
	0.342	0.014	5269	0.007	2.192	0.042	0.314	0.371
Currently married (Proportion currently married among EMW age 15-55)								
	0.898	0.005	5269	0.004	1.096	0.005	0.889	0.907
Children born (Mean CEB to EMW age 15-49)								
	2.310	0.036	4879	0.021	1.703	0.016	2.238	2.383
Male children born (Mean male CEB to EMW age 15-49)								
	1.182	0.020	4879	0.015	1.355	0.017	1.142	1.223
Female children born (Mean female CEB to EMW age 15-49)								
	1.128	0.022	4879	0.016	1.408	0.019	1.084	1.172
Living children (Mean number of LC to EMW age 15-49)								
	2.110	0.031	4879	0.019	1.619	0.014	2.049	2.171
Male living children (Mean number of MLC to EMW age 15-49)								
	1.075	0.018	4879	0.014	1.286	0.016	1.040	1.111
Female living children (Mean number of FLC to EMW age 15-49)								
	1.128	0.022	4879	0.016	1.408	0.019	1.084	1.172
Pregnancy Outcomes (Mean number of terminations to EMW age 15-49)								
	2.701	0.041	4879	0.025	1.670	0.015	2.618	2.783
Spontaneous abortions (Mean number of SA to EMW age 15-49)								
	0.192	0.010	4879	0.008	1.245	0.050	0.173	0.211
Induced abortions (Mean number of IA to EMW age 15-49)								
	0.136	0.010	4879	0.007	1.432	0.073	0.116	0.156
Spontaneous and induced abortions (Mean number of SA & IA to EMW age 15-49)								
	0.328	0.015	4879	0.010	1.440	0.046	0.298	0.358
Live births after 1996 (Proportion of LB per pregnancy outcome)								
	0.821	0.011	2843	0.007	1.460	0.013	0.800	0.842
Stillbirths after 1996 (Proportion of SB per pregnancy outcome)								
	0.017	0.002	2843	0.002	1.017	0.144	0.012	0.022
Spontaneous abortions after 1996 (Proportion of SA per pregnancy outcome)								
	0.093	0.007	2843	0.005	1.241	0.073	0.079	0.106
Induced abortions after 1996 (Proportion of IA per pregnancy outcome)								
	0.070	0.007	2843	0.005	1.457	0.100	0.056	0.084

Note: Design effect is the ratio of standard error divided by standard error assuming simple random sampling.

APPENDIX D

CONSTRUCTION OF STANDARD OF LIVING INDEX

Income (or expenditure or wealth) is known to influence the social and health behaviour of individual or family. To quantify the differential behaviour by economic status reliable data on economic status of family or individual is needed. Information obtained directly on income or wealth, in spite of detailed questioning, from surveys is subject to a lot of reporting (non-sampling) errors. Frustrated by less productive attempts to obtain reliable information on income or wealth, social and epidemiological survey researchers contended with some indirect indicators of income or wealth. Even the well known elaborately planned and executed surveys, like the National Family Health Surveys and Reproductive Health Surveys did not attempt to collect information directly on income or wealth. Quality of housing and ownership of housing have been serving as proxy for the economic status of families. In the last two or three decades consumer goods have flooded the Indian markets. Hence ownership of assets can also serve as indicators of standard of living. The NFHS gathered data on assets and constructed an index, called Standard of Living Index (SLI), by summing scores assigned to ownership of assets.

Following the same procedure SLI is constructed for the present study also. Though all the assets covered under the NFHS are available in the present study also, the categorization of the responses for a few of the assets, like housing type, is slightly different. Twenty-nine asset variables and the scores for the responses are given below.

Asset variables	Response	Score	
1. House Type	a. Pucca (roof made of Cement/RC)	4	
	b. Semi pucca (roof made of Tiles / Asbestos / Tin sheets)	2	
	c. Kachha (others)	0	
2. Toilet Facility	a. Own flush toilet	4	
	b. Public or shared toilet or own pit toilet	2	
	c. No facility	0	
3. Source of lighting	a. Electricity	2	
	b. Others	0	
4. Main fuel for cooking	a. Electricity, Liquefied petroleum gas or Bio-gas	2	
	b. Kerosene, Coal or Charcoal	1	
	c. Others	0	
5. Source of drinking water	a. Own pipe or hand pipe	2	
	b. Public tap, hand pipe or well	1	
	c. Others	0	
6. Number of rooms in the dwelling	a. Two or more	1	
	b. One	0	
7. Ownership of house	a. Owns	2	
	b. Not owns	0	
8. Ownership of Agricultural land	a. 5 acres or more	4	
	b. 2-4 acres	3	
	c. Less than 2 acres	2	
	d. No agricultural land	0	
9. Ownership of irrigated land	a. Household owns at least some irrigated land	2	
	b. Owns no irrigated land	0	
10. Ownership of livestock	a. Owns livestock	2	
	b. Does not own livestock	0	
11. Ownership of durable goods	Owns car :	Yes	4
		No	0
	Owns tractor:	Yes	4
		No	0
	Owns moped/scooter/motorcycle	Yes	3
		No	0
	Owns Telephone:	Yes	3
		No	0
	Owns Refrigerator:	Yes	3
		No	0
	Owns Colour TV:	Yes	3
		No	0
	Owns bicycle:	Yes	2
		No	0
	Owns electric fan:	Yes	2
		No	0
	Owns radio/transistor:	Yes	2
		No	0

Owns sewing machine:	Yes	2
	No	0
Owns black & white TV:	Yes	2
	No	0
Owns water pump:	Yes	2
	No	0
Owns bullock cart:	Yes	2
	No	0
Owns mattress:	Yes	1
	No	0
Owns pressure cooker:	Yes	1
	No	0
Owns chair:	Yes	1
	No	0
Owns cot/bed:	Yes	1
	No	0
Owns table:	Yes	1
	No	0
Owns clock/watch:	Yes	1
	No	0

After scoring the responses to the asset variables, the scores are added. The sum of the scores is the Standard of Living Index. Theoretically the index has a minimum of zero and a maximum of 65. In the sample households of the study it ranged from 0 to 60 with a mean of 20.10 and standard deviation of 10.83. The households are grouped into three categories, those with 'Low', 'Medium' and 'High' standard of living as shown below.

Score	Status	Percent
00 – 14	Low	34.72
15 – 24	Medium	34.06
25 – 60	High	31.22
00 – 60	All	100.00



APPENDIX E

CONSTRUCTION OF
ASSET INDEX

Obtaining reliable information on wealth or income in field surveys has time and again proved to be a futile exercise. Many argued for collecting data on expenditure rather than on income as household expenditure is considered to be a good proxy for income and also easier to collect more reliable data on expenditure than income. But in surveys whose main objective is different from solely assessing income, the questions to be asked to assess household expenditure are too many and time involving. So few questions are asked on assets such as ownership of house, land, livestock and other consumer goods and generally an index is constructed by subjectively assigning scores (Example IIPS and ORC Macro, 2000). Instead of subjective scoring, Filmer and Pritchett (2001) resort to principal component analysis even for the National Family Health Survey of India data and found quite useful in estimating wealth effects on educational enrollments in states of India. It is felt that principal component analysis would provide much better asset index than the arbitrary scoring and the procedure is described below.

The variables, henceforth called ‘asset indicators’ or ‘asset variables’, used in the construction of ‘asset index’ and the range of values are:

Sl No.	Variable	Values	Label	Percent
1	Own clock/watch	1	Yes	83.4
		0	No	16.6
2	Own bicycle	1	Yes	50.8
		0	No	49.2

3	Own radio	1	Yes	38.5
		0	No	61.5
4	Own television	1	Yes	53.5
		0	No	46.5
5	Own sewing machine	1	Yes	10.3
		0	No	89.7
6	Own motorcycle/scooter	1	Yes	18.0
		0	No	82.0
7	Own refrigerator	1	Yes	8.3
		2	No	91.7
8	Own car	1	Yes	1.2
		2	No	98.8
9	Presence of piped drinking water	1	Yes	81.4
		0	No	18.6
10	Presence of flush toilet	1	Yes	34.2
		0	No	65.8
11	Presence of electric light	1	Yes	87.2
		0	No	12.8
12	Number of rooms in the dwelling	1	One	22.6
		2	Two	37.3
		3	Three	21.5
		4	Four	11.7
		5	Five	4.2
		6	Six	1.6
		7	Seven	0.7
		8	Eight	0.3
		9	Nine	0.1
		10	Ten	0.1
13	Cooking fuel	1	Biomass	57.6
		0	Others	42.4
14	Good quality roofing	1	Good quality	34.4
		0	Others	65.6
15	Poor quality roofing	1	Poor quality	25.1
		0	Others	74.9
16	Ownership of land	1	Owens 6 or more acres of	3.0
			land	97.0
		0	Others	

Principal component analysis is performed and the first principal component with largest eigenvalue is 4.659 and variance accounted by this is 29.118 percent. The scoring factors for the first principal component are provided below.

Sl. No	Variable	Scoring factor
1	Own clock/watch	0.521
2	Own bicycle	0.497
3	Own radio	0.521
4	Own television	0.703
5	Own sewing machine	0.425
6	Own motorcycle/scooter	0.634
7	Own refrigerator	0.559
8	Own car	0.254
9	Presence of piped drinking water	0.092
10	Presence of flush toilet	0.693
11	Presence of electric light	0.492
12	Number of rooms in the dwelling	0.692
13	Cooking fuel	-0.711
14	Good quality roofing	0.600
15	Poor quality roofing	-0.548
16	Ownership of land	0.201

The asset index is then the sum of the products of the corresponding asset variables and scoring factor. The households are distributed according to the asset index and the cut off points are identified to group them into three equal sizes. The lowest one-third of the households on the basis of asset index is called “low”, the middle one-third is “medium” and the top one-third is “high”.

To check internal coherence percent of ownership of each asset that went into the analysis are compared across the three asset categories, viz., ‘low’, ‘medium’ and ‘high’. In addition average annual income of the family is also compared. Though wealth and income are two different concepts, it is thought that the high-income families are likely to be rich also. The comparisons clearly indicate that there is an acceptable level of internal coherence.

Percent* of households possessing specific asset in the three asset categories

Asset	Low	Medium	High
Clock/watch	55.07	95.61	100.00
Bicycle	21.86	52.25	78.46
Radio	11.56	36.18	67.91
Television	7.63	57.73	95.30
Sewing machine	0.60	4.77	25.53
Motorcycle/scooter	0.27	4.99	48.88
Refrigerator	0.11	0.27	24.38
Car	0.00	0.00	3.50
Piped drinking water	76.71	82.46	85.02
Flush toilet	2.29	21.66	78.62
Electric light	63.25	98.57	99.84
Number of rooms in the dwelling	1.61	2.34	3.50
Cooking with biomass	96.46	64.91	11.48
Good quality roofing	6.05	25.99	71.35
Poor quality roofing	59.65	13.98	1.42
Ownership of land 6 acres and above	0.38	1.97	6.56
Annual family income	20198	33094	72231

* In the case of number of rooms in the household and the annual family income the figure refers to average.

APPENDIX F

LIFE TABLE ANALYSIS OF INFANT AND CHILD MORTALITY

Table F.1 Life Table analysis of deaths among children born to women during six years preceding the survey.

Age in months	Living children	Children died	Person months exposed	mx	qx	lx
0	21	62	2289.50	0.027080	0.026718	1.000000
1	20	6	2235.00	0.002685	0.002681	0.973282
2	29	2	2206.50	0.000906	0.000906	0.970872
3	33	3	2173.00	0.001381	0.001380	0.969793
4	31	3	2138.00	0.001403	0.001402	0.968455
5	32	1	2104.50	0.000475	0.000475	0.967097
6	38	7	2065.50	0.003389	0.003383	0.966638
7	41	0	2022.50	0.000000	0.000000	0.963367
8	36	2	1983.00	0.001009	0.001008	0.963367
9	28	1	1949.50	0.000513	0.000513	0.962396
10	23	0	1923.50	0.000000	0.000000	0.961902
11	27	2	1897.50	0.001054	0.001053	0.961902
12	29	0	1868.50	0.000000	0.000000	0.960889

13	41	1	1833.00	0.000546	0.000545	0.960889
14	48	0	1788.00	0.000000	0.000000	0.960365
15	32	0	1748.00	0.000000	0.000000	0.960365
16	39	0	1712.50	0.000000	0.000000	0.960365
17	38	0	1674.00	0.000000	0.000000	0.960365
18	41	1	1634.00	0.000612	0.000612	0.960365
19	24	0	1601.00	0.000000	0.000000	0.959777
20	13	0	1582.50	0.000000	0.000000	0.959777
21	33	0	1559.50	0.000000	0.000000	0.959777
22	25	1	1530.00	0.000654	0.000653	0.959777
23	28	0	1503.00	0.000000	0.000000	0.959150
24	42	1	1467.50	0.000681	0.000681	0.959150
25	34	0	1429.00	0.000000	0.000000	0.958497
26	28	0	1398.00	0.000000	0.000000	0.958497
27	29	0	1369.50	0.000000	0.000000	0.958497
28	33	0	1338.50	0.000000	0.000000	0.958497
29	38	0	1303.00	0.000000	0.000000	0.958497
30	45	0	1261.50	0.000000	0.000000	0.958497
31	34	0	1222.00	0.000000	0.000000	0.958497
32	22	0	1194.00	0.000000	0.000000	0.958497
33	38	0	1164.00	0.000000	0.000000	0.958497
34	37	0	1126.50	0.000000	0.000000	0.958497
35	23	0	1096.50	0.000000	0.000000	0.958497
36	29	0	1070.50	0.000000	0.000000	0.958497
37	35	0	1038.50	0.000000	0.000000	0.958497
38	29	0	1006.50	0.000000	0.000000	0.958497
39	32	0	976.00	0.000000	0.000000	0.958497
40	33	0	943.50	0.000000	0.000000	0.958497
41	30	0	912.00	0.000000	0.000000	0.958497
42	27	0	883.50	0.000000	0.000000	0.958497
43	32	0	854.00	0.000000	0.000000	0.958497
44	27	0	824.50	0.000000	0.000000	0.958497

45	24	0	799.00	0.000000	0.000000	0.958497
46	21	0	776.50	0.000000	0.000000	0.958497
47	26	0	753.00	0.000000	0.000000	0.958497
48	28	2	725.00	0.002759	0.002755	0.958497
49	29	0	695.50	0.000000	0.000000	0.955857
50	28	0	667.00	0.000000	0.000000	0.955857
51	20	0	643.00	0.000000	0.000000	0.955857
52	35	0	615.50	0.000000	0.000000	0.955857
53	30	1	582.50	0.001717	0.001715	0.955857
54	35	0	549.50	0.000000	0.000000	0.954217
55	35	0	514.50	0.000000	0.000000	0.954217
56	26	0	484.00	0.000000	0.000000	0.954217
57	36	0	453.00	0.000000	0.000000	0.954217
58	26	0	422.00	0.000000	0.000000	0.954217
59	33	0	392.50	0.000000	0.000000	0.954217
60	26	0	363.00	0.000000	0.000000	0.954217
61	34	0	333.00	0.000000	0.000000	0.954217
62	35	0	298.50	0.000000	0.000000	0.954217
63	26	0	268.00	0.000000	0.000000	0.954217
64	29	0	240.50	0.000000	0.000000	0.954217
65	37	0	207.50	0.000000	0.000000	0.954217
66	33	0	172.50	0.000000	0.000000	0.954217
67	34	0	139.00	0.000000	0.000000	0.954217
68	18	0	113.00	0.000000	0.000000	0.954217
69	31	0	88.50	0.000000	0.000000	0.954217
70	27	0	59.50	0.000000	0.000000	0.954217
71	19	0	36.50	0.000000	0.000000	0.954217
72	17	0	18.50	0.000000	0.000000	0.954217
73	7	0	6.50	0.000000	0.000000	0.954217
74	3	0	1.50	0.000000	0.000000	0.954217

APPENDIX G

UNDER-ENUMERATION OF
SPONTANEOUS AND SEX SELECTIVE
ABORTIONS

Spontaneous abortions

This section deals with estimation of under-enumeration of spontaneous abortions. The method of estimation is as follows. Bongaarts and Potter (1983) have provided a distribution of intrauterine death (spontaneous abortions and stillbirths) per 100 pregnancies in progress at four weeks from the last menstrual period based on reliable earlier studies. According to them the number of intrauterine deaths by gestation weeks is as follows.

Gestational age (weeks)	Intrauterine mortality (%)	Ratio of successive percentages
4- 7	8.1	13.73
8-11	5.9	2.03
12-15	2.9	2.90
16-19	1.0	1.67
20-23	0.6	2.00
24-27	0.3	1.50
28-31	0.2	1.00
32-35	0.2	0.67
36-39	0.3	0.60
40+	0.5	-----
	20.0	

Source: Bongaarts and Potter (1983), p39.

As there is no behavioural intervention associated with spontaneous abortions, it is expected that the distribution of spontaneous abortions enumerated in the survey should exhibit the same pattern, though not the level. By adjusting the enumerated spontaneous abortions to follow the same ratio as could be observed from Bongaarts and Potter in the early weeks of gestation, the quantum of under-enumeration is identified. This approach yields an estimate of under-enumeration of only early intrauterine mortality, under the assumption that there is no under-enumeration of late intrauterine mortality.

The enumerated intrauterine deaths are given in the following table by weeks of gestation. First it is obvious from the table that there is under-enumeration of spontaneous abortions that occurred at early weeks of gestational age. We also notice heaping of observations in 8th, 12th, 17th, 21st, 25th, and 30th weeks of gestation. This clearly shows that women tend to report the gestation period largely rounding of to months of gestation and are unable to recollect exact number of weeks of gestation.

Weeks of Gestation	Number of Intrauterine Deaths
4	0
5	0
6	1
7	0
8	46
9	0
10	0
11	0
12	142
13	0
14	0
15	0
16	0
17	51
18	0
19	0
20	0
21	19

22	0
23	0
24	0
25	3
26	0
27	0
28	0
29	0
30	9
31	1
32	0
33	0
34	9
35	0
36	0
37	0
38	11
39	8
40+	12
Total	312

This type of heaping creates problem in fitting of curve. So class intervals are taken with a width of 4 weeks. To overcome the situation first a curve that fits well the cumulated frequency of Bongaarts and Potter data up to 36th week was identified. The equation that fitted the data is a fourth degree polynomial and that explained 99.98 percent of the variations in the observed data. The polynomial is

$$Y = -20.23690 + 5.48504 x - 0.19584 x^2 + 0.00714 x^3 - 0.00006 x^4$$

It is, therefore, expected that a fourth degree polynomial may be fitted for the survey data also. But it showed a poor fit as the expected values did not show monotonically increasing trend, which is supposed to be in any cumulated distributions. Hence a fourth degree polynomial is fitted for cumulated observations up to 22 weeks of gestation and then a second degree polynomial is fitted for the remaining data up to 36th week. The fourth degree polynomial, which explained 94.71 percent of variation in the observed data, is

$$Y = 452.00066 - 174.85215 x + 21.74637 x^2 - 0.98128 x^3 + 0.01524 x^4,$$

and the second degree polynomial, which explained 93.40 percent of variation, is

$$Y = 307.6970 - 4.5589 x + 0.1054 x^2.$$

From the predicted cumulated number of intrauterine deaths the expected number of deaths was then computed by subtracting successive cumulated numbers. Still there were some minor abnormalities (negative numbers) at the early weeks of gestation in the estimates, which are adjusted to zeros, particularly for the fourth and fifth week of gestation. Then the predicted numbers of intrauterine deaths are grouped to match the grouping of Bongaarts and Potter. The ratios of the frequencies of successive classes are also computed. Predicted numbers of intrauterine deaths and ratios of the frequencies of successive classes are given in the following table. It can be seen that the ratios for the first two classes are substantially less compared to the figures based on Bongaarts and Potter. Applying Bongaarts and Potter ratios, the estimates for the first two classes are obtained and given in the same table. It can be seen that the percent under-enumeration of spontaneous abortions for gestational age of 4 and above is $(3029-263)*100/3029= 91$ and the percent under-enumeration for gestational age of 8 weeks and above is $(352-258)*100/352= 27$.

Gestation age(weeks)	Intrauterine deaths	Ratio of successive Percentages	Ratio from Bongaarts and Potter	Intrauterine deaths applying first two ratios
4- 7	5	0.0495	13.73	2677
8-11	101	1.0521	2.03	195
12-15	96	2.3415	2.90	96
16-19	41	2.5625	1.67	41
20-23	16	2.0000	2.00	16
24-27	8	1.1429	1.50	8
28-31	7	1.0000	1.00	7
32-35	7	0.3684	0.67	7
36-39	19	1.5833	0.60	19
40+	12			12
Total	312			3078
Stillbirths	49			49
Spontaneous abortions	263			3029

It is not easy for any woman to realize that she is pregnant at fifth week of gestational age of pregnancy. Any spontaneous abortion during fifth or sixth week of gestation is likely to be confused with late menstruation. Women generally consider a spontaneous abortion in the fifth, sixth or seventh week, sometimes even at the eighth week, of gestational age as delayed menses and not as a spontaneous abortion. Many women can detect their pregnancy only after seventh week of gestation. Even if some women were able to detect their pregnancies at early gestational age and, if such pregnancies end as spontaneous abortions at early weeks of gestation, they may consider those as insignificant events in their life and forget to report. Further early spontaneous abortions are not associated with serious health problems to mothers to make the experience a significant one in their life. Hence they are easily forgotten. It is also possible that spontaneous abortions of gestational age of 8-11 weeks can also be underreported.

If only the pregnancies of at least 8 weeks of gestation are considered, the under-enumeration rate for spontaneous abortion is about 27 percent.

Sex selective infanticide and abortions

In Tamil Nadu, it has been claimed that female sex selective abortion is being practiced in certain pockets. Parts of Salem, Erode, Dharmapuri and Theni districts are considered to be notorious for the practice of female sex selective infanticide in the past and the entire Tamil Nadu for the practice of female sex selective abortion at present. There is a claim that the practice of sex selective infanticide has declined substantially and sex selective abortion has replaced sex selective infanticide. In the recent past the incidence of sex selective infanticide has been a rare event. However, there has also been a claim that the infanticides are reported as stillbirths. If female infanticides are practiced and reported as stillbirths, then there would be an imbalance in the sex ratio of stillbirths. In the survey there were 30 male stillbirths and 19 female stillbirths during six years preceding the survey. The sex ratio is 1579 males per 1000 females. This is contrary to the expectation that the ratio has to be less than 1000 if there were reports of female stillbirths concealing female sex selective infanticides.

Any practice of sex selective abortion should be reflected in the sex ratio at birth as long as a specific sex is selectively aborted. If female fetuses have been selectively aborted then the sex ratio at birth should be more masculine. Between 1997 and the date of survey, there have been 1200 male births and 1133 female births to the respondents in the survey. That is a sex ratio of 1059 male births per 1000 female births. This is within the normal range of 1050-1060 males per 1000 females in populations where sex selective abortions are not practiced. So there is no clear evidence for any substantial level of incidence of sex selective abortions in Tamil Nadu.

Between 1997 and the date of survey, 2825 pregnancies were enumerated for which the outcome is known. Out of these only for 438 (15.5 percent) pregnancies sonography was done. The outcome was induced abortion for 2.3 percent among those pregnancies for which sonography was done and 7.9 for which sonography was not done. Among women who underwent sonography only 6.4 percent (that is only one percent of all outcomes) reported that they had it to determine the sex of the foetus. These pregnancies resulted in 14 male births and 11 female births, providing no clear evidence for existence of sex selective abortions in a large-scale. It is also possible that a substantial percent of women may have concealed the fact that they had it to determine the sex of foetus. The extreme situation is that all who had sonography done had it to determine the sex of foetus. There were 222 male births and 206 female births among the pregnancies for which sonography was done. This yields a sex ratio of 1078 male births for 1000 female births. For the sample of 428 total births, this ratio is not significantly different from the normal ratio of 1050-1060 male births per 1000 female births. It may, therefore, be concluded that the incidence of sex selective abortion in Tamil Nadu is very less and certainly not to the extent of making a dent in the sex ratio at birth.

APPENDIX H

PREGNANCY OUTCOME IN TAMIL NADU

A SURVEY WITH SPECIAL REFERENCE TO ABORTION COMPLICATIONS, COST AND CARE

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